

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a minor, municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The discharge results from the operation of a public elementary school. This permit action includes deleting an interim effluent flow tier and updating the effluent limitations and special conditions contained in the permit.

1. Facility Name and Address: Grange Hall Elementary School
19301 Hull Street Road
Moseley, Virginia 23120
2. SIC Code: 8211
3. Permit No. VA0020222
Permit Expiration Date: September 10, 2008
4. Owner Contact:
Name: Dr. Michael J. McEnvoy
Title: Environmental Health and Safety Officer

Telephone No.: 804/318-8048

Address: Chesterfield County School Board
9800 Krause Rd.
Chesterfield, VA 23832
5. Application Complete Date: June 11, 2008
Permit Drafted By: Ray Jenkins Date: June 6, 2008
DEQ Regional Office: Piedmont Regional Office

Reviewed By: Jaime Bauer Date: June 9, 2008
Curt Linderman Date: June 13, 2008
Kyle Winter Date: June 17, 2008
6. Receiving Stream: Name: Sappony Creek
River Mile: 2-SPP004.64
Basin: Appomattox River
Subbasin: NA
Section: 5c
Class: III
Special Standards: None

1-Day, 10-Year Low Flow: 0 MGD
7-Day, 10-Year Low Flow: 0 MGD
30-Day, 5-Year Low Flow: 0 MGD
Harmonic Mean Flow: 0 MGD

See **Attachment A**.

Tidal: No
On 303(d) list: Yes

7. Operator License Requirements: A **Class IV** operator is required. The Sewage Collection and Treatment (SCAT) Regulations, 9 VAC 25-790 et seq., recommend the minimum daily hours that the treatment works should be manned by a licensed operator or other operating staff.
8. Reliability Class: The permittee is required to maintain **Class II Reliability** for this facility. Reliability is a measure of the ability of a component or system to perform its designated function without failure or interruption of service. The reliability classification is based on the water quality and public health consequences of a component or system failure.
9. Permit Characterization: (Check as many as appropriate)
- | | |
|--|--|
| <input type="checkbox"/> Issuance | <input checked="" type="checkbox"/> Existing Discharge |
| <input checked="" type="checkbox"/> Reissuance | <input type="checkbox"/> Proposed Discharge |
| <input type="checkbox"/> Revoke & Reissue | <input checked="" type="checkbox"/> Effluent Limited |
| <input type="checkbox"/> Owner Modification | <input checked="" type="checkbox"/> Water Quality Limited |
| <input type="checkbox"/> Board Modification | <input type="checkbox"/> WET Limit |
| <input type="checkbox"/> Change of Ownership/Name | <input type="checkbox"/> Interim Limits in Permit |
| Effective Date: | <input type="checkbox"/> Interim Limits in Other Document (attached) |
| <input checked="" type="checkbox"/> Municipal | <input type="checkbox"/> Compliance Schedule Required |
| SIC Code(s): 8211 | <input type="checkbox"/> Site Specific WQ Criteria |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Variance to WQ Standards |
| SIC Code(s): | <input type="checkbox"/> Water Effects Ratio |
| <input checked="" type="checkbox"/> POTW | <input checked="" type="checkbox"/> Discharge to 303(d) Listed Segment |
| <input type="checkbox"/> PVOTW | <input type="checkbox"/> Toxics Management Program Required |
| <input type="checkbox"/> Private | <input type="checkbox"/> Toxics Reduction Evaluation |
| <input type="checkbox"/> Federal | <input type="checkbox"/> Pretreatment Program Required |
| <input type="checkbox"/> State | <input type="checkbox"/> Storm Water Management Plan |
| <input type="checkbox"/> Publicly-Owned Industrial | <input type="checkbox"/> Possible Interstate Effect |

10. Wastewater Flow and Treatment:

| Outfall Number | Wastewater Source | Treatment | Flow |
|----------------|-------------------------------|--|---------------------------|
| 001 | Grange Hall Elementary School | Comminutor / bar screen, flow equalization, activated sludge basin (extended aeration mode), clarification, chlorination, dechlorination (tablet) / post aeration. Sludge holding tank. Soda ash is added as needed at the head of the activated sludge basin to increase the pH. | 0.016 MGD design capacity |

See **Attachment B** for a facility diagram.

11. Sludge Disposal: Sludge is pumped and hauled to the Proctors Creek Wastewater Treatment Plant for additional treatment and disposal.

12. Discharge Location Description: This facility discharges to Sappony Creek.
Name of USGS topo map: Clayville VA – topographic map number 101A.
See Attachment C.

13. Material Storage: Soda ash and hypochlorite are stored in an adjacent maintenance and control building.

14. Ambient Water Quality Information:

Ambient data characterizing the quality of the receiving stream are not needed because the receiving stream has zero flow at the theoretical low flows at which effluent limitations are evaluated. The quality of the effluent will therefore, establish the quality of the receiving stream.

Although the specific receiving stream for this facility was not assessed for Recreation Use, it is included in the Appomattox River Watershed Bacteria TMDL, which was approved by the EPA on August 30, 2004 and amended in January 2009.

15. Antidegradation Review and Comments:

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect those uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and

social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. The receiving stream, Sappony Creek, is determined to be a Tier 1 waterbody. This determination is a result of the stream's classification as an intermittent stream. Therefore, the stream itself could not sustain a normal, indigenous aquatic community and consequently is classified as a Tier 1 waterbody.

16. Site Inspection: Heather Horne conducted an inspection on June 6, 2008. Her report is included as **Attachment D** to the fact sheet.

17. Effluent Screening and Limitation Development:

See **Attachment E** for effluent data (from Discharge Monitoring Reports).

See **Attachment F** for dissolved data from the facility's daily log sheets.

Attachment G presents the development of the ammonia and total residual chlorine limitations in the draft permit. Included in Attachment G are the MSTRANTI printout and STATS.exe analyses for ammonia and total residual chlorine. The input information for MSTRANTI is as follows:

- a. Stream flows are zero per the flow frequency analysis provided in Attachment A. Because these flows are zero, it is not necessary to input stream quality information to the MSTRANTI spreadsheet.
- b. The mix percentages are shown as 100% because the entire stream flow will be effluent.
- c. An effluent hardness concentration was provided for the reissuance in 2003. That same concentration is used for this reissuance.
- d. The temperature of 30 °C is from Attachment F.
- e. The effluent pH values are taken from Attachment E.

See **Attachment H** for the Stream Sanitation Analysis memorandum and modeling information. The facility was upgraded in 1995. As the actual sewage flow to the facility remained low however, the previous design capacity of 6,600 gallons per day remained the basis for establishing effluent limitations. With the reissuance in 2003, an effluent limitations page was included in the permit for the upgraded design flow of 16,000 gallons per day. That permit however, also included limitations for 6,600 gallons per day until the flow exceeded 6,600 gallons per day. With this reissuance the interim flow tier for 6,600 gallons per day has been deleted because the stream modeling raises questions about maintaining water quality standards in the receiving stream given the BOD₅ limitations for the 6,600 gallons per day flow tier. The data in Attachment F indicate that the facility is in compliance with the cBOD₅ limitations; therefore, a compliance schedule is not needed.

The stream sanitation analysis assumes TKN will hydrolyze to ammonia in the receiving stream and exert an oxygen demand. Guidance Memorandum 00-2011, however, advises that if the modeled TKN (3 mg/L) is greater than the ammonia limitation (1.1 mg/L), only the ammonia limitation need be incorporated into the permit. TKN limitations were therefore, not included in the permit.

| Part I.A | | | | | | | |
|--------------------------|------------------|-----------------------|-----------------------|-----------|---------|-------------------------|-------------|
| PARAMETER | BASIS FOR LIMITS | DISCHARGE LIMITS | | | | MONITORING REQUIREMENTS | |
| | | Monthly Average | Weekly Average | Minimum | Maximum | Frequency | Sample Type |
| 001 Flow | NA | NL – monitoring only | | NA | NL | 1/Day | |
| 002 pH | 3 | NA | NA | 6.0 su | 9.0 su | 1/Day | Grab |
| 003 cBOD ₅ | 2, 4 | 16 mg/L 970 gms/d | 24 mg/L 1500 gms/d | NA | NA | 1/Month | Grab |
| 004 TSS | 1 | 30 mg/L 1800 gms/d | 45 mg/L 2700 gms/d | NA | NA | 1 / 6 Months | Grab |
| 005 TRC | 2 | 8.0 µg/L | 9.6 µg/L | NA | NA | 1/Day | Grab |
| 007 DO | 2 | NA | NA | 6.0 mg/L | NA | 1/Day | Grab |
| 039 NH ₃ as N | 2 | 1.1 mg/L | 1.1 mg/L | NA | NA | 1 / 3 Months | Grab |
| 157 TRC*contact | 3 | NA | NA | 1.0 mg/l | NA | 1/Day | Grab |
| 213 TRC*contact | 3 | NA | NA | 0.60 mg/l | NA | ***** | ***** |
| 846 <i>E. coli</i> ** | 5 | 126 N/100 mL | NA | NA | NA | 2/Month | Grab |

1. Federal Effluent guidelines
2. Water Quality-based Limits
3. Best Engineering Judgement
4. Model – see Attachment H
5. TMDL. The TMDL allocates a yearly total *E. coli* count of 2.79×10^{10} at 16,000 gpd. This total count is calculated using a monthly geometric mean concentration of 126 N / 100 mL. The limitation of 126 N / 100 mL therefore, insures compliance with the TMDL allocation.

* 157 and 213 TRC samples are taken prior to dechlorination (i.e., they are not final effluent)

** Geometric mean

18. Basis for Sludge Use & Disposal Requirements: Not applicable, as this facility does not land apply sludge.
19. Antibalancing: All limitations in the draft permit are the same as in the 2003 permit except that *E. coli* limitations have been added to Part I.A and *E. coli* has replaced fecal coliform in Part I.B.

20. Additional Total Residual Chlorine Limitations and Monitoring Requirements– Part I.B.

These limitations and monitoring requirements are required by the Water Quality Standards, 9 VAC 25-260-170 – Fecal Coliform Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

Part I.B also establishes appropriate bacterial, effluent limitations if chlorine disinfection is not used.

21. Special Conditions – Part I.C:

a. Special Condition C.1 – 95% Capacity Reopener

Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 2 for all POTW and PVOTW permits.

This special condition is the same as in the 2003 permit.

b. Special Condition C.2 – O&M Manual Requirement

Rationale: Required by Code of Virginia § 62.1-44.19; the Sewage Collection and Treatment Regulations, 9 VAC 25-790; and the VPDES Permit Regulation, 9 VAC 25-31-190 E.

This special condition has been revised to be consistent with current guidance regarding the elements to be included in an O&M Manual.

c. Special Condition C.3 – Licensed Operator Requirement

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 C and the Code of Virginia § 54.1-2300 et seq., Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.), require licensure of operators.

This special condition is the same as in the 2003 permit.

d. Special Condition C.4. – Reliability Class

Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities.

This special condition is the same as in the 2003 permit.

e. Special Condition C.5 – Sludge Use and Disposal

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P, 220 B 2, and 420 through 720; and 40 CFR Part 503 require all treatment works treating domestic

sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

This special condition was revised to delete reference to the Virginia Department of Health as DEQ now has responsibility for biosolids disposal.

f. Special Condition C.6. – Sludge Reopener

Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-220 C 4 for all permits issued to treatment works treating domestic sewage.

This special condition is the same as in the 2003 permit.

g. Special Condition C.7 – Compliance Reporting Under Part I.A.

Rationale: Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limitation or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

This special condition has been revised to reflect current format and content.

h. Special Condition C.8 – Materials Handling/Storage

Rationale: 9 VAC 25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia § 62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

This special condition is the same as in the 2003 permit.

[Special Condition C.9 in the 2003 permit was deleted. Closure of sanitary sewage treatment plants is addressed in the Virginia Sewage Collection and Treatment Regulations. It is therefore, not necessary to also address closure in a special condition in the permit.]

[Special Condition C.10 in the 2003 permit was deleted. The nutrient reopener is no longer applicable to this discharge.]

[Special Condition C.11 – Flow Based Effluent Limitations – in the 2003 permit was deleted as discussed in item 17 above.]

i. Special Condition C.9 – CTC/CTO Requirements

Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulation, 9 VAC 25-790-50.

This is a new special condition.

j. Special Condition C.10 – TMDL Reopener

Rationale: Section 303(d) of the Clean Water Act requires that TMDLs be developed for waters listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving waters. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

This is a new special condition.

Note that this facility is included in the Appomattox River Watershed Bacteria TMDL. See item 14 above.

k. Special Condition C.11 – Reduced Monitoring Sampling Frequencies

Rationale: Permittees are granted a reduction in monitoring frequency based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations related to the effluent limitations for which reduced frequencies were granted. If permittees fail to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring reduction.

This is a new special condition. With this reissuance, monitoring frequencies are being reduced. This evaluation is based on a comparison of existing effluent data to the limitations for the 16,000 gallons per day wastewater treatment plant.

22. Part II, Conditions Applicable to All VPDES Permits

The VPDES Permit Regulation at 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

23. Changes to Current Permit:

| Changes to permit cover page |
|---|
| The format was revised to be consistent with the current template. The River Basin was changed from James River (middle) to Appomattox River, and the section was changed from section 6 to section 5c in accordance with revised standards effective January 12, 2006. The nutrient enriched water designation – NEW-2 – has been repealed and was therefore, deleted. Minor editing of the facility name and location. Permit will be signed by the Water Permit Manager. |

| Changes to Part I.A – 0.0066 MGD |
|---|
| This flow tier was deleted as discussed in item 17 of the fact sheet. |

| Changes to Part I.A – 0.016 MGD flow | | | | | |
|--|-----------------|-----------|-------------------------|--------|---|
| Parameter | Effluent Limits | | Monitoring Requirements | | Rationale |
| | From | To | From | To | |
| BOD ₅ and TSS loadings | kg/d | grams/day | ---- | ---- | Units changed and limits rewritten to report whole numbers and reflect two significant figures in accordance with DEQ Guidance Memo 06-2016 |
| TSS | --- | --- | 1 / M | 1 / 6M | Reduced monitoring – see Attachment E |
| Ammonia | --- | --- | 1 / M | 1 / 3M | |
| <i>E. coli</i> | ---- | 126 | ---- | 2/M | Required to address bacterial TMDL |
| <p>Other changes to Part I.A – 0.016 MGD flow</p> <p>In paragraph I.A.1, “at Outfall 001” was added to designate the point at which the limitations and monitoring requirements apply.</p> <p>Reformatted the monthly average and weekly average columns for the concentration and mass limitations.</p> <p>Language added to footnote (1).</p> <p>Added footnote (2) regarding significant figures.</p> <p>Added footnote (4) to establish time period for <i>E. coli</i> sampling.</p> <p>Changed footnote (2) in the 2003 permit to footnote (3) in the draft permit.</p> | | | | | |

| Changes to Part I.B |
|---|
| <p>New title and format.</p> <p>The phrase “each operating” in regard to monitoring at the chlorine contact tank was added to B.1.a.</p> <p>Part I.B.2 in the 2003 permit was deleted as <i>E. coli</i> monitoring is now required in Part I.A.</p> |

| Changes to Part I.C |
|---------------------|
| See item 21 above |

24. Variances/Alternate Limits or Conditions:

Reduced Monitoring Frequencies: The monitoring frequency for TSS, and ammonia were reduced in Part I.A of the permit. Permittees having exemplary operations that consistently meet permit requirements are considered for reduced monitoring per Guidance Memorandum 98-2005 and in accordance with EPA's "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies" (EPA 833-B-96-001). Except for a warning letter issued August 2005 addressing reporting deficiencies, the facility has consistently been in compliance with the terms and limitations of the permit and has not been the subject of any enforcement action during the past three years. The facility is therefore, eligible for reduced monitoring. See Attachment E for an analysis of effluent data.

25. Public Notice Information required by 9 VAC 25-31-280 B:

Comment period: Start Date: August 3, 2008 End Date: September 2, 2008

Publication dates: August 3, 2008 and August 10, 2008 in the *Richmond Times-Dispatch*

All pertinent information is on file and may be inspected or copied by contacting Ray Jenkins at:

Virginia Department of Environmental Quality (DEQ)
Piedmont Regional Office
4949-A Cox Road
Glen Allen, Virginia 23060-6296

Telephone Number 804/527-5037
Facsimile Number 804/527-5106
Email rrjenkins@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed reissuance of the permit, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within the comment period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing, and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

Following the comment period, the Board will make a determination regarding the proposed reissuance. That determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

26. Additional Comments:

a. Previous Board Action: None.

- b. State Corporation Commission verification as required by § 62.1-44.15:3 of the State Water Control Law does not apply to this publicly-owned facility. That section of the law requires that privately owned treatment works serving, or designed to serve, 50 or more residences are incorporated in the Commonwealth and are in compliance with all regulations and relevant orders of the State Corporation Commission.
- c. The Financial Assurance/Closure regulation (9 VAC 25-650-10) does not apply to this publicly-owned facility. That regulation applies to privately owned treatment works that treat sewage generated by private residences and that discharge more than 1000 gallons per day and less than 40,000 gallons per day.
- d. The Regulation of Users (9 VAC 25-31-280.B.9) does not apply to this facility because there are no industrial users contributing to the treatment works and the facility is municipally owned. That regulation requires that the fact sheet describe how industrial discharges to a sewerage system are being regulated for all treatment works not owned by a state or municipality.
- e. This facility is not subject to the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia because the facility is not expanding (a Certificate to Operate the 16,000 gallon per day treatment plant was issued prior to July 2005) and the current flow is less than 500,000 gallons per day (nontidal waters). If the treatment facility is ever expanded to a flow of 40,000 gallons per day or greater, the facility will be subject to the above cited general permit and the nutrient "permitted design capacity" will be 911 pounds per year total nitrogen and 122 pounds per year total phosphorus based on the current design flow of 16,000 gallons per day. Annual average concentration limitations for total nitrogen and total phosphorus may also be established at that time.
- f. Public Comment: None

27. Summary of attachments to this Fact Sheet:

| | |
|--------------|--|
| Attachment A | Flow Frequency Determination / 303(d) Status |
| Attachment B | Wastewater Treatment Plant Schematic |
| Attachment C | Location Map |
| Attachment D | Site Inspection |
| Attachment E | Effluent Data |
| Attachment F | Temperature Data from Daily Log Sheets |
| Attachment G | MSTRANTI and STATS Printouts |
| Attachment H | Stream Sanitation Analysis |

Attachment A


Flow Frequency Determination / 303(d) Status

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
Grange Hall Elementary School STP – VA0020222

TO: Ray Jenkins

FROM: Jennifer V. Palmore, P.G. 

DATE: March 4, 2008

COPIES: File

The Grange Hall Elementary School's sewage treatment plant discharges to Sappony Creek in Chesterfield County near Skinquarter. The river mile for the discharge is 2-SPP004.64. Flow frequencies have been requested at this site for use in developing effluent limitations for the VPDES permit.

At the discharge point, the receiving stream is shown as an intermittent stream on the USGS Clayville Quadrangle. The flow frequencies for intermittent streams are listed below:

Outfall 001:

| | |
|------------------|----------------------------|
| 1Q30 = 0.00 cfs | High Flow 1Q10 = 0.00 cfs |
| 1Q10 = 0.00 cfs | High Flow 7Q10 = 0.00cfs |
| 7Q10 = 0.00 cfs | High Flow 30Q10 = 0.00 cfs |
| 30Q10 = 0.00 cfs | HM = 0.00 cfs |
| 30Q5 = 0.00 cfs | |

Due to its intermittent nature, the receiving stream is considered a Tier 1 water. Effluent data should be used to characterize the stream during low flow conditions.

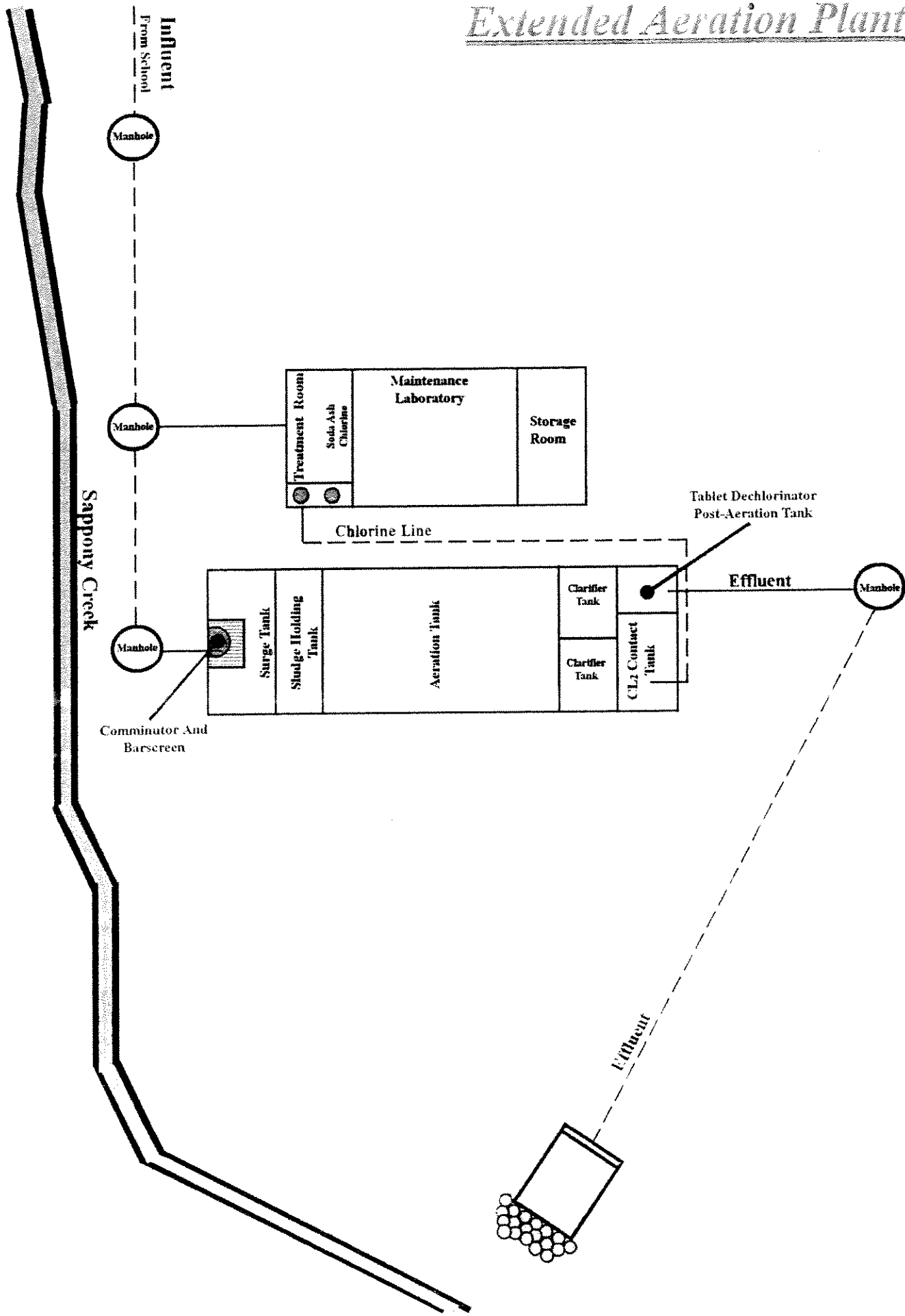
Sappony Creek was not assessed during the 2006 305(b)/303(d) Water Quality Assessment cycle; the stream is therefore considered a Category 3A water. Although the receiving stream was not assessed for the Recreation Use, the facility is included in the Appomattox River Watershed Bacteria TMDL, which was approved by the EPA on August 30, 2004. Grange Hall Elementary received a wasteload allocation of $1.15\text{E}+10$ E. coli cfu/year. This allocation was based on a design flow of 0.0066 MGD.

If you have any questions concerning this analysis, please let me know.

Attachment B

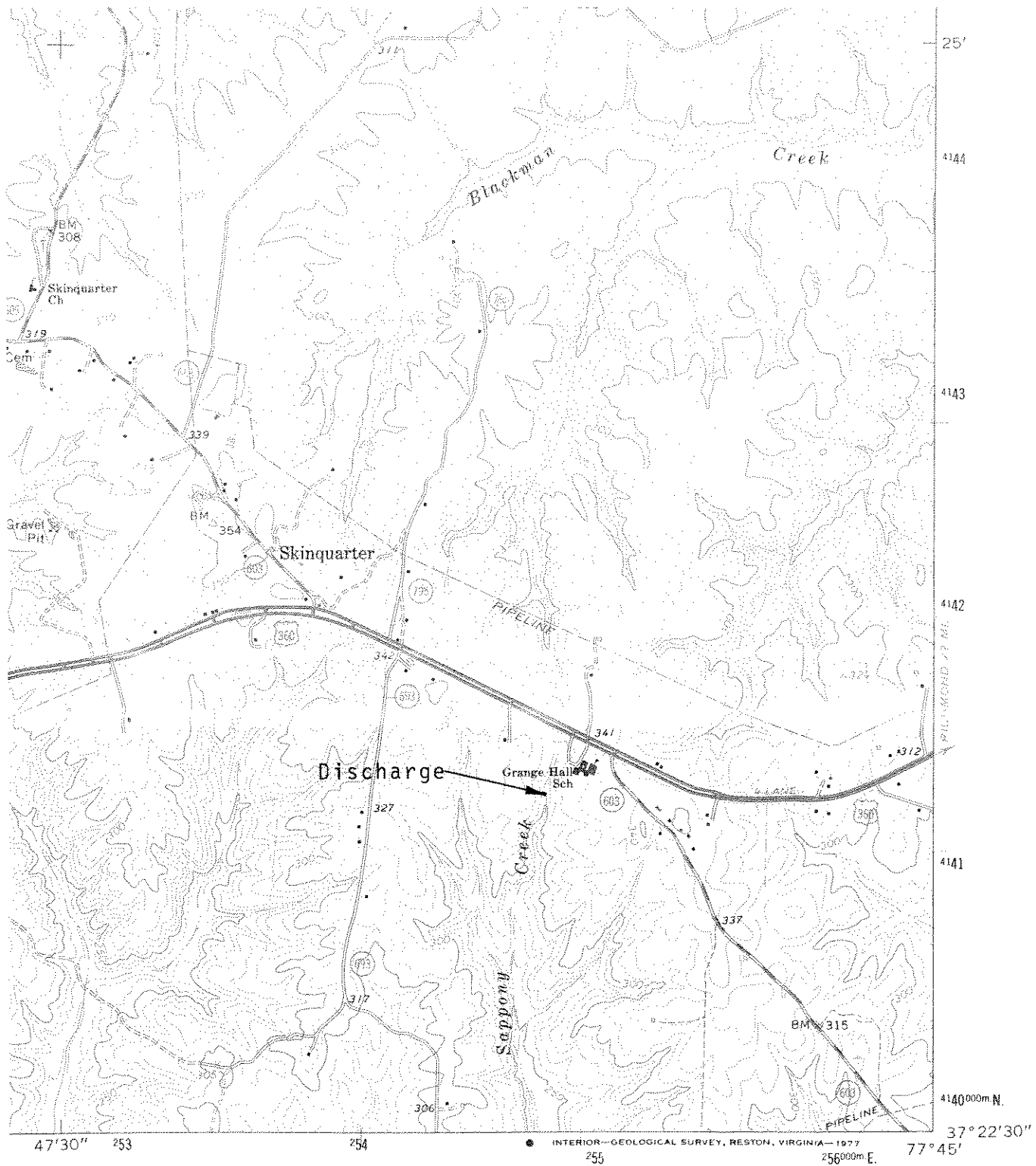
Wastewater Treatment Plant Schematic

Extended Aeration Plant



Attachment C

Location Map



MILE

ROAD CLASSIFICATION

Heavy-duty Light-duty
 Medium-duty Unimproved dirt
 U.S. Route State Route



CLAYVILLE, VA.
 N3722.5—W7745/7.5

101A

1964

PHOTOREVISED 1968
 AMS 5458 IV NE—SERIES V834

(WINTERPOCK)
 5458 / SW

Attachment D

Site Inspection

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Piedmont Regional Office WASTEWATER FACILITY INSPECTION REPORT

| | | | |
|--|--|--------------------------------|---------------------------------|
| FACILITY NAME: | <u>Grange Hall Elementary School STP</u> | INSPECTOR: | <u>Heather A. Horne</u> |
| PERMIT No.: | <u>VA0020222</u> | INSPECTION DATE: | <u>June 6, 2008 (1315-1433)</u> |
| TYPE OF FACILITY: | <u>Municipal, Minor (Small)</u> | REPORT COMPLETED: | <u>June 12, 2008</u> |
| COUNTY/CITY: | <u>Chesterfield</u> | UNANNOUNCED INSPECTION: | <u>NO</u> |
| REVIEWED BY: | | | |
| PRESENT DURING INSPECTION: <u>Scott Barbini, operator (cell: 804-380-8514); Mike Webb, operator in training; Meredith Williams, DEQ</u> | | | |

I. OPERATIONAL UNIT REVIEW AND CONDITION:

Chemical Storage/Usage: A building adjacent to the plant is used for chemical storage, office, and laboratory purposes. The facility maintains a log book for all chemical usage. Soda ash is maintained in the chemical building in order to increase the pH of incoming wastewater. Approximately ten pounds of soda ash is used daily. The facility mixes a ratio of one pound of soda ash:one gallon of water. This mixture is fed into the head of the aeration basin. Chlorine is also mixed in this building. The facility uses a chlorine mixture of 1 gallon of chlorine:10 gallons of water. A scale is present to accurately measure chemicals. An eye wash station, PPE, and MSDS are present for chemicals.

Comminutor and Bar Screen: Wastewater from Grange Hall Elementary School is collected by a sanitary sewer and flows by gravity to the comminutor at the head of the treatment plant. The comminutor chamber is provided with a coarse bar screen underneath of it to be used when the comminutor is not in operation. The comminutor is in continuous service. Screenings are placed in the sludge holding tank which is pumped and hauled as needed.

Surge Tank: The 14,000 gallon surge tank has two submersible pumps that are automatic lead/lag which operate by a float switch. Only one pump is used at a time. The pumps are alternated to keep them both operational. Air is added by a diffused aeration system provided by one of two blowers. The aeration is continuous. The high level alarm is operational. The wastewater is pumped from the surge tank to the flow control box where a controlled flow rate is delivered via a 45° v-notch weir to the aeration tank and the excess flow is returned to the surge tank via a telescoping valve.

Aeration Basin: A soda ash addition line for pH adjustment precedes the aeration basin. Diffused air is provided by alternated blowers that are cycled 15 minutes on and 30 minutes off. There are six air diffusers. The facility plans to drop the aeration basins and clean the diffusers in the summer of 2008. Six froth sprayers can use water from the clarifiers. Operators reported that the froth sprayers have never been utilized. The basin appeared to have good floc formation and was brown in color. Settleability test is performed occasionally.

Clarifier: The aerated wastewater flows from the aeration tank to the clarifier. The two clarifiers are operated in series. The clarifier has a dual hopper bottom section to aid in the settling and thickening of sludge. The airlift sludge return and skimmer operates by the blowers. The sludge is pumped back to a sludge trough at the head of the aeration tank. The trough is constructed with stop gates into the aeration tank and sludge holding tank for returning or wasting sludge. At the time of inspection, return sludge appeared uniform with a medium brown color. Some scum was observed in the clarifier.

Sludge Holding Tank: The operator wastes sludge to the sludge holding tank as needed. The tank contents are aerated. The sludge tank was pumped and hauled two days prior to inspection. Typically, this tank is pumped 3-5 times per year. Supernatant or overflow from the sludge holding tank is returned to the aeration basin. The operator uses the sludge to reseed the plant if a problem occurs.

Chlorination: Chlorination is accomplished by injecting liquid 12.5% sodium hypochlorite solution via a pump feeder to the chlorine contact tank. A chemical feed tank is used to mix and meter the chlorine solution.

Dechlorination: Dechlorination is accomplished by a tablet dechlorinator. Multiple tubes were in use at the time of inspection.

Post Aeration: Post aeration is provided by one of two blowers that run continuously.

Flow measurement: The effluent passes through a 30E v-notch weir with an ultrasonic level sensor to measure flow.

II. ULTIMATE DISPOSAL OF SOLIDS:

Sludge is pumped and hauled by a contractor.

III. FIELD DATA:

Flow: No discharge. Dissolved Oxygen: mg/L Contact Chlorine Res.: mg/L
 pH: S.U. Final Chlorine Res.: mg/L Temperature: EC

Calibration Time/Initials/documentation:

Condition of Effluent: There was no discharge at the time of the inspection. The wastewater appeared clear in the post aeration basin.

Condition of Receiving Stream: Sappony Creek: There did not appear to be any negative environmental impacts from the facility to the receiving stream.

Samples Collected during the inspection: None.

IV. PLANT OPERATIONS AND MAINTENANCE:

Operations and Maintenance Manual: The O & M Manual is dated December 2, 1994

Class and Number of Licensed Operators: One Class IV licensed operator

Alarm Systems and Alternate Power: Alarm systems report by calling the operator and then the operator in training by telephone.

Any bypassing since last inspection? No

When was the RPZ device last checked? 5/10/08

Name, number and description of pump stations: None- gravity fed.

V. COMMENTS:

Items evaluated during this inspection include (check all that apply):

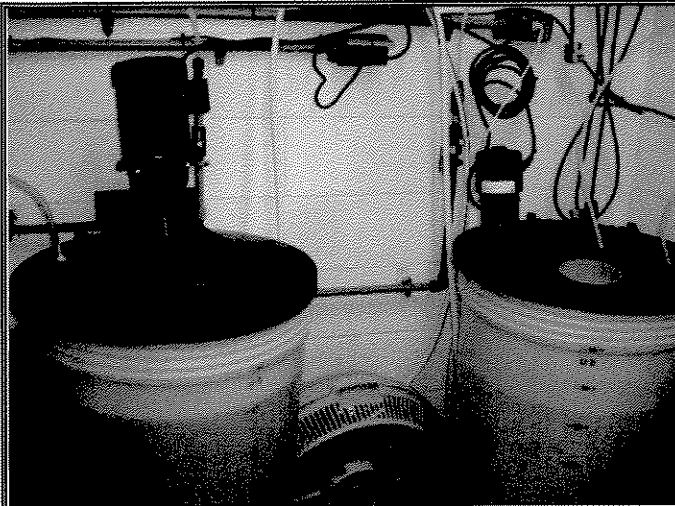
| | |
|--|--|
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Operational Units |
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | O & M Manual |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Maintenance Records |
| <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Pathogen Reduction & Vector Attraction Reduction |
| <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Sludge Disposal Plan |
| <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Groundwater Monitoring Plan |
| <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Storm Water Pollution Prevention Plan |
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Permit Special Conditions |
| <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Permit Water Quality Chemical Monitoring |
| <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Laboratory Records (see Lab Report) |

VI. GENERAL RECOMMENDATIONS:

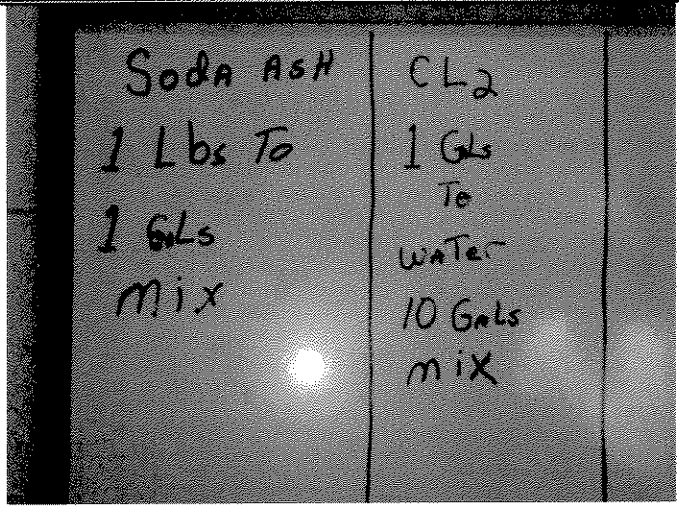
1. Perform settleability test at least weekly and record in an operations logbook.
2. Mr. Barbini is a very knowledgeable and conscientious operator.

VII. COMPLIANCE RECOMMENDATIONS/REQUEST FOR CORRECTIVE ACTION:

1. None.



Photograph 1: Chemical storage



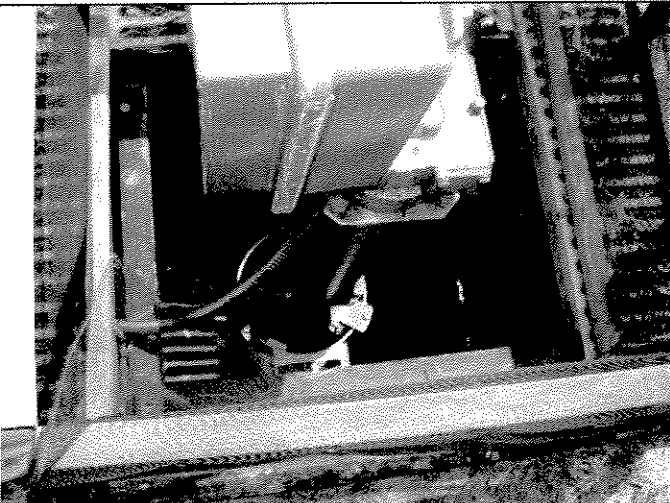
Photograph 2: Chemical mixtures posted in building



Photograph 3: Soda ash addition point



Photograph 4: Plant overview



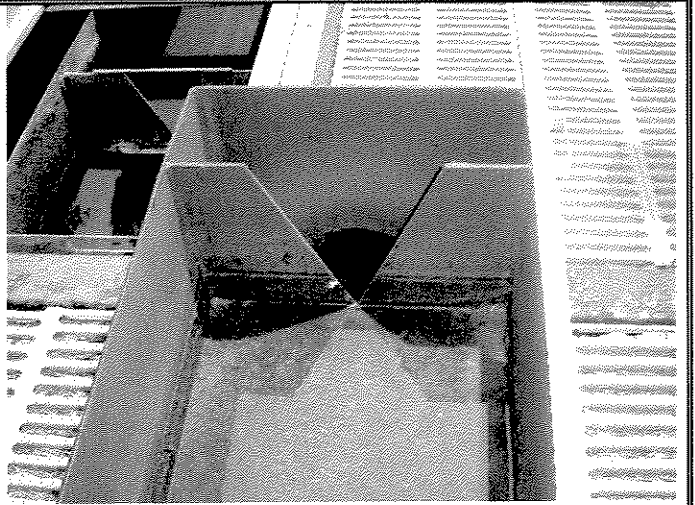
Photograph 5: Comminutor and bar screen



Photograph 6: Two surge blowers



Photograph 7: Surge trough with telescoping valve



Photograph 8: V-notch weir to aeration tank



Photograph 9: Sludge return trough



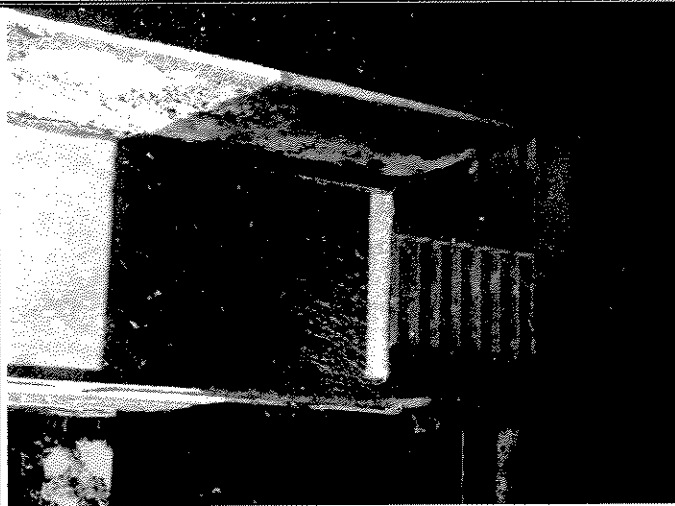
Photograph 10: Blowers 3 and 4



Photograph 11: Clarifier 1 (some scum present)



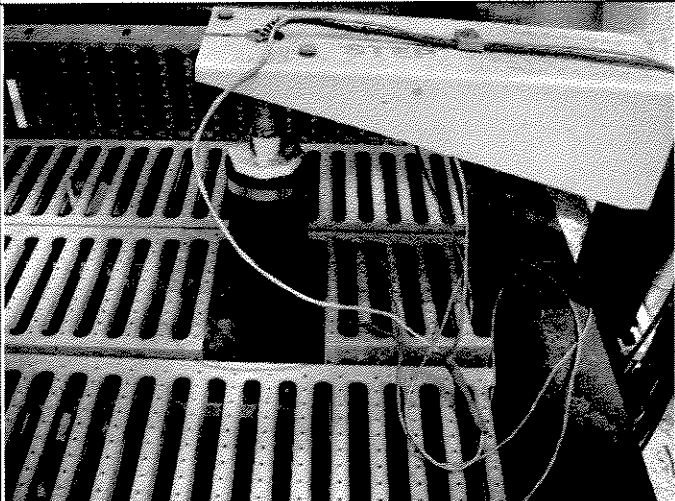
Photograph 12: Post aeration blowers



Photograph 13: Trough from Clarifier 2 to chlorination



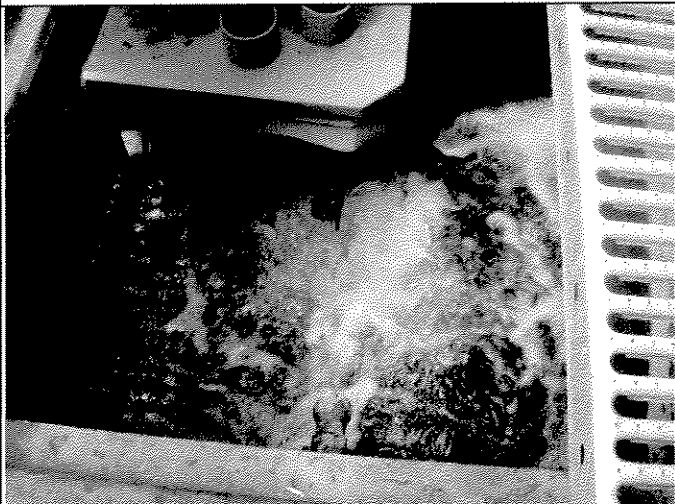
Photograph 14: Chlorine contact tank. Some floatable material (leaves, etc.) present.



Photograph 15: Flow meter



Photograph 16: 4 tube tablet dechlorinator



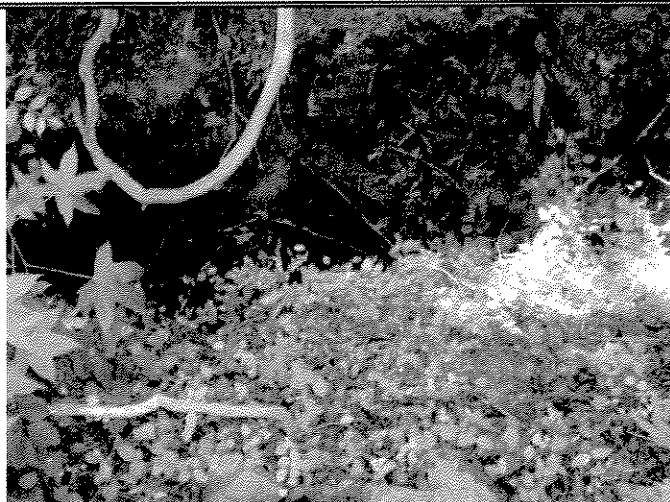
Photograph 17: Post aeration



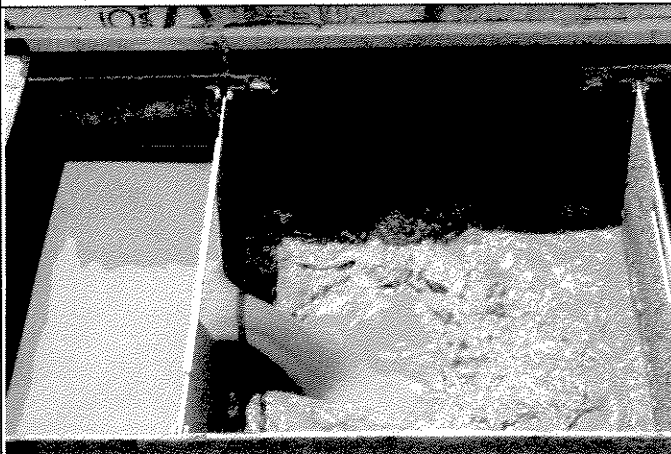
Photograph 18: Outfall 001



Photograph 19: Outfall 001 conveyance



Photograph 20: Receiving stream- Sappony Creek



Photograph 21: Return sludge being pumped following the lab inspection

Attachment E

Effluent Data

Attachment E

Effluent Data

Effluent Data from Discharge Monitoring Reports

| Date | Flow, MGD | | pH, SU | | BOD ₅ , mg/L | TSS, mg/L | D.O., mg/L | Ammonia, mg/L |
|-----------|-----------|---------|---------|---------|-------------------------|-----------|------------|---------------|
| | Average | Maximum | Minimum | Maximum | | | | |
| 2005 | | | | | | | | |
| May | 0.00362 | 0.00481 | 7.7 | 7.8 | 5 | 1 | 8.0 | 0.20 |
| June | 0.00366 | 0.00428 | 7.7 | 7.8 | <5 | 1 | 8.0 | <0.2 |
| July | No flow | | | | | | | |
| August | No flow | | | | | | | |
| September | 0.00241 | 0.00301 | 7.7 | 7.8 | <5 | 2 | 8.0 | <0.2 |
| October | 0.00350 | 0.00499 | 7.7 | 7.8 | <5 | 6 | 8.0 | <0.2 |
| November | 0.00333 | 0.00463 | 7.7 | 7.8 | <5 | 2 | 9.0 | <0.2 |
| December | 0.00281 | 0.00342 | 7.7 | 7.8 | <5 | 1 | 8.7 | <0.2 |
| 2006 | | | | | | | | |
| January | 0.00269 | 0.00361 | 7.7 | 7.8 | <5 | <1 | 8.8 | <0.2 |
| February | 0.00275 | 0.00387 | 7.7 | 7.8 | <5 | <1 | 8.7 | <0.2 |
| March | 0.00262 | 0.00350 | 7.7 | 7.8 | <5 | <1 | 8.5 | 0.51 |
| April | 0.00271 | 0.00368 | 7.7 | 7.8 | <5 | <1 | 8.0 | <0.2 |
| May | 0.00259 | 0.00364 | 7.7 | 7.8 | <5 | <1 | 8.0 | <0.2 |
| June | 0.00308 | 0.00381 | 7.7 | 7.8 | <5 | <1 | 8.0 | <0.2 |
| July | No flow | | | | | | | |
| August | No flow | | | | | | | |
| September | 0.00285 | 0.00354 | 7.7 | 7.8 | <5 | 2 | 8.0 | 0.60 |
| October | 0.00261 | 0.00317 | 7.7 | 7.8 | <5 | <1 | 8.0 | 1.20 |
| November | 0.00271 | 0.00372 | 7.7 | 7.8 | <5 | 1 | 8.5 | <0.2 |
| December | 0.00271 | 0.00354 | 7.8 | 7.8 | <5 | 1 | 9.4 | 0.30 |
| 2007 | | | | | | | | |
| January | 0.00266 | 0.00351 | 7.7 | 7.8 | <5 | 1 | 9.0 | 0.30 |
| February | 0.00255 | 0.00304 | 7.7 | 7.8 | <5 | 1 | 9.7 | <0.2 |
| March | 0.00264 | 0.00375 | 7.7 | 7.8 | <5 | 1 | 9.4 | <0.2 |
| April | 0.00263 | 0.00350 | 7.7 | 7.8 | 12 | 1 | 9.2 | <0.2 |
| May | 0.00262 | 0.00371 | 7.7 | 7.8 | <5 | 1 | 8.0 | <0.2 |
| June | 0.00244 | 0.00290 | 7.7 | 7.8 | 14 | 1 | 8.0 | <0.2 |
| July | No flow | | | | | | | |
| August | No flow | | | | | | | |
| September | 0.00254 | 0.00297 | 6.5 | 7.8 | 12 | 3 | 7.2 | <0.2 |
| October | 0.00221 | 0.00343 | 6.5 | 7.8 | <5 | <1 | 7.0 | <0.2 |
| November | 0.00263 | 0.00398 | 6.5 | 6.5 | <5 | <1 | 8.0 | <0.2 |
| December | 0.00254 | 0.00293 | 6.5 | 7 | <5 | 3 | 9.5 | <0.2 |
| 2008 | | | | | | | | |
| January | 0.00253 | 0.00328 | 6.7 | 7 | <5 | 3 | 10.2 | 0.27 |
| February | 0.00264 | 0.00363 | 6.5 | 6.8 | <5 | 1 | 10.5 | <0.2 |
| March | 0.00261 | 0.00362 | 6.5 | 6.7 | <5 | 1 | 10.0 | 0.46 |
| April | 0.00240 | 0.00373 | 6.5 | 7.3 | <5 | 1 | 8.2 | 0.46 |

| Date | Flow, MGD | | pH, SU | | BOD ₅ , mg/L | TSS, mg/L | D.O., mg/L | Ammonia, mg/L |
|--|-------------------|-----------------|-----------------|---------|-------------------------|-----------|------------|---------------|
| | Average | Maximum | Minimum | Maximum | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Average value | | | | | 10.8 | 1.7 | | 0.5 |
| Maximum value | 0.00366 | 0.00499 | 7.8 | 7.8 | | | | |
| Minimum value | | | 6.5 | 6.5 | | | | |
| | | 90th percentile | 7.7 | 7.8 | | | | |
| | | 10th percentile | 6.5 | 7.0 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Monthly Average Effluent Limitations: | | | | | 19* | 30 | | 1.1 |
| | | | | | | | | |
| Ratio of actual average to monthly average limitation: | | | | | 56.8% | 6% | | 45% |
| | | | | | | | | |
| Monitoring frequency can be reduced from 1 / Month to: | | | | | remains 1 / M | 1 / 6 M | | 1 / Q |
| | | | | | | | | |
| * The monthly average cBOD ₅ limitation in Part I.A of 16 mg/L was converted to BOD ₅ by multiplying by a factor of 1.2 so that the reported data can be compared to the limitation. | | | | | | | | |
| The monitoring frequency cannot be reduced for pH and dissolved oxygen. The minimum reported pH of 6.5 SU is within 0.5 SU of the minimum limitation. The frequency of dissolved oxygen monitoring cannot be reduced unless post aeration is accomplished with a passive system. Also see item 23 in the fact sheet. | | | | | | | | |
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| Effluent Data from the Permit Application | | | | | | | | |
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| Fecal Coliform: | | | | | | | | |
| | | | | | | | | |
| | February 7, 2008 | | <1 CFU / 100 mL | | | | | |
| | | | | | | | | |
| | February 14, 2008 | | <1 CFU / 100 mL | | | | | |
| | | | | | | | | |
| | June 9, 2008 | | <1 CFU / 100 mL | | | | | |

Attachment F

Temperature Data from Daily Log Sheets

Attachment F

Temperature Data from Daily Log Sheets -- "D.O. Calibration Temperture /D.O."

| Date | | Temperature, °C |
|------|-----------------------------|-----------------|
| 2007 | May | 18 |
| | | 20 |
| | | 19 |
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| | | 23 |
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| | | 23 |
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| | | 24 |
| | | 25 |
| | | 25 |
| | | 26 |
| | June | 22 |
| | | 22 |
| | | 26 |
| | | 26 |
| | | 24 |
| | July August September | 25 |
| | | 27 |
| | | 25 |
| | | no flow |
| | | no flow |
| | | 31 |
| | | 29 |
| | | 32 |
| | | 30 |
| | | 28 |
| | | 32 |
| | | 28 |
| | | 29 |
| | | 28 |
| | | 31 |
| | | 27 |
| | | 30 |
| | | 28 |
| | | 28 |
| | | 29 |
| | | 31 |

| Date | Temperature, °C |
|----------|-----------------|
| 2007 | 30 |
| October | 26 |
| | 30 |
| | 28 |
| | 26 |
| | 27 |
| | 31 |
| | 32 |
| | 30 |
| | 32 |
| | 26 |
| | 28 |
| | 31 |
| | 32 |
| | 30 |
| | 32 |
| | 32 |
| | 32 |
| | 32 |
| | 34 |
| | 30 |
| | 27 |
| | 26 |
| | 25 |
| | 26 |
| November | 25 |
| | 27 |
| | 24 |
| | 23 |
| | 22 |
| | 21 |
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| | 15 |
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| | 17 |
| | 16 |
| | 19 |
| December | 15 |
| | 12 |
| | 16 |
| | 16 |
| | 14 |
| | 15 |
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| | 17 |
| | 14 |
| | 13 |

| Date | Temperature, °C |
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| 2008 | |
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| January | |
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| Date | Temperature, °C |
|-----------------|-----------------|
| 2008 | 9 |
| | 13 |
| April | 12 |
| | 12 |
| | 11 |
| | 13 |
| | 15 |
| | 14 |
| | 13 |
| | 14 |
| | 13 |
| | 16 |
| | 15 |
| | 17 |
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| | 15 |
| | 15 |
| | 16 |
| | 18 |
| | 15 |
| | 16 |
| | 17 |
| | 17 |
| | 18 |
| | 20 |
| | 18 |
| | 12 |
| Annual Average | 18.6 |
| 90th percentile | 30 |

Attachment G

MSTRANTI and STATS Printouts

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Grange Hall Elementary School
Receiving Stream: Sappony Creek

Permit No.: VA0026222

Version: OWP Guidance Memo 00-2011 (8/24/00)

| Stream Information | | | Stream Flows | | | Mixing Information | | | Effluent Information | | |
|---|-------|--|----------------------|-------|--|-------------------------|-------|--|---|-----------|--|
| Mean Hardness (as CaCO ₃) = | mg/L | | 1Q10 (Annual) = | 0 MGD | | Annual - 1Q10 Mix = | 100 % | | Mean Hardness (as CaCO ₃) = | 480 mg/L | |
| 90% Temperature (Annual) = | deg C | | 7Q10 (Annual) = | 0 MGD | | - 7Q10 Mix = | 100 % | | 90% Temp (Annual) = | 30 deg C | |
| 90% Temperature (Wet season) = | deg C | | 30Q10 (Annual) = | 0 MGD | | - 30Q10 Mix = | 100 % | | 90% Temp (Wet season) = | deg C | |
| 90% Maximum pH = | SU | | 1Q10 (Wet season) = | 0 MGD | | Wet Season - 1Q10 Mix = | % | | 90% Maximum pH = | 7.8 SU | |
| 10% Maximum pH = | SU | | 30Q10 (Wet season) = | 0 MGD | | - 30Q10 Mix = | % | | 10% Maximum pH = | 7 SU | |
| Tier Designation (1 or 2) = | 1 | | 30Q5 = | 0 MGD | | | | | Discharge Flow = | 0.016 MGD | |
| Public Water Supply (PWS) Y/N? = | n | | Harmonic Mean = | 0 MGD | | | | | | | |
| Trout Present Y/N? = | n | | Annual Average = | MGD | | | | | | | |
| Early Life Stages Present Y/N? = | y | | | | | | | | | | |

| Parameter (ug/l unless noted) | Background Conc. | Water Quality Criteria | | | Wasteload Allocations | | | Antidegradation Baseline | | | Antidegradation Allocations | | | Most Limiting Allocations | | |
|-------------------------------------|---------------------|------------------------|----------|----------|-----------------------|---------|---------|--------------------------|---------|-------|-----------------------------|----------|----|---------------------------|---------|----------|
| | | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) |
| Acenaphthene | 0 | -- | -- | na | 2.7E+03 | -- | -- | na | 2.7E+03 | -- | -- | -- | -- | -- | -- | na |
| Acrolein | 0 | -- | -- | na | 7.8E+02 | -- | -- | na | 7.8E+02 | -- | -- | -- | -- | -- | -- | na |
| Acrylonitrile ^c | 0 | -- | -- | na | 6.8E+00 | -- | -- | na | 6.8E+00 | -- | -- | -- | -- | -- | -- | na |
| Aldrin ^c | 0 | 3.0E+00 | -- | na | 1.4E-03 | 3.0E+00 | -- | na | 1.4E-03 | -- | -- | -- | -- | 3.0E+00 | -- | na |
| Ammonia-N (mg/l) | 0 | 1.2E+01 | 1.7E+00 | na | -- | 1.2E+01 | 1.2E+00 | na | -- | -- | -- | -- | -- | 1.2E+01 | 1.2E+00 | na |
| Ammonia-N (mg/l) | 0 | 1.2E+01 | 3.18E+03 | na | -- | 1.2E+01 | 3.2E+00 | na | -- | -- | -- | -- | -- | 1.2E+01 | 3.2E+00 | na |
| (High Flow) | 0 | -- | -- | na | 1.1E+05 | -- | -- | na | 1.1E+05 | -- | -- | -- | -- | -- | -- | na |
| Athracene | 0 | -- | -- | na | 4.3E+03 | -- | -- | na | 4.3E+03 | -- | -- | -- | -- | -- | -- | na |
| Antimony | 0 | 3.4E+02 | 1.5E+02 | na | -- | 3.4E+02 | 1.5E+02 | na | -- | -- | -- | -- | -- | 3.4E+02 | 1.5E+02 | na |
| Arsenic | 0 | -- | -- | na | -- | -- | -- | na | -- | -- | -- | -- | -- | -- | -- | na |
| Barium | 0 | -- | -- | na | -- | -- | -- | na | -- | -- | -- | -- | -- | -- | -- | na |
| Benzene ^c | 0 | -- | -- | na | 7.1E+02 | -- | -- | na | 7.1E+02 | -- | -- | -- | -- | -- | -- | na |
| Benzidine ^c | 0 | -- | -- | na | 5.4E-03 | -- | -- | na | 5.4E-03 | -- | -- | -- | -- | -- | -- | na |
| Benzo (a) anthracene ^c | 0 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | -- | -- | -- | -- | na |
| Benzo (b) fluoranthene ^c | 0 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | -- | -- | -- | -- | na |
| Benzo (k) fluoranthene ^c | 0 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | -- | -- | -- | -- | na |
| Benzo (a) pyrene ^c | 0 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | -- | -- | -- | -- | na |
| Bis(2-Chloroethyl) Ether | 0 | -- | -- | na | 1.4E+01 | -- | -- | na | 1.4E+01 | -- | -- | -- | -- | -- | -- | na |
| Bis(2-Chloroisopropyl) Ether | 0 | -- | -- | na | 1.7E+05 | -- | -- | na | 1.7E+05 | -- | -- | -- | -- | -- | -- | na |
| Bromofom ^c | 0 | -- | -- | na | 3.6E+03 | -- | -- | na | 3.6E+03 | -- | -- | -- | -- | -- | -- | na |
| Butylbenzylphthalate | 0 | -- | -- | na | 5.2E+03 | -- | -- | na | 5.2E+03 | -- | -- | -- | -- | -- | -- | na |
| Cadmium | 0 | 1.9E+01 | 3.4E+00 | na | -- | 1.9E+01 | 3.4E+00 | na | -- | -- | -- | -- | -- | 1.9E+01 | 3.4E+00 | na |
| Carbon Tetrachloride ^c | 0 | -- | -- | na | 4.4E+01 | -- | -- | na | 4.4E+01 | -- | -- | -- | -- | -- | -- | na |
| Chlordane ^c | 0 | 2.4E+00 | 4.3E-03 | na | 2.2E-02 | 2.4E+00 | 4.3E-03 | na | 2.2E-02 | -- | -- | -- | -- | 2.4E+00 | 4.3E-03 | na |
| Chloride | 0 | 8.6E+05 | 2.3E+05 | na | -- | 8.6E+05 | 2.3E+05 | na | -- | -- | -- | -- | -- | 8.6E+05 | 2.3E+05 | na |
| TRC | 0 | 1.9E+01 | 1.1E+01 | na | -- | 1.9E+01 | 1.1E+01 | na | -- | -- | -- | -- | -- | 1.9E+01 | 1.1E+01 | na |
| Chlorobenzene | 0 | -- | -- | na | 2.1E+04 | -- | -- | na | 2.1E+04 | -- | -- | -- | -- | -- | -- | na |

| Parameter (ug/L unless noted) | Background Conc. | Water Quality Criteria | | | Wasteload Allocations | | | Antidegradation Baseline | | | Antidegradation Allocations | | | Most Limiting Allocations | | |
|--|---------------------|------------------------|---------|----------|-----------------------|---------|---------|--------------------------|----------|---------|-----------------------------|----------|---------|---------------------------|---------|----------|
| | | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) |
| Chlorobromomethane ^c | 0 | -- | -- | na | 3.4E+02 | -- | -- | na | 3.4E+02 | -- | -- | -- | -- | -- | -- | na |
| Chloroform ^c | 0 | -- | -- | na | 2.9E+04 | -- | -- | na | 2.9E+04 | -- | -- | -- | -- | -- | -- | na |
| 2-Chloronaphthalene | 0 | -- | -- | na | 4.3E+03 | -- | -- | na | 4.3E+03 | -- | -- | -- | -- | -- | -- | na |
| 2-Chlorophenol | 0 | -- | -- | na | 4.0E+02 | -- | -- | na | 4.0E+02 | -- | -- | -- | -- | -- | -- | na |
| Chlorpyrifos | 0 | 8.3E-02 | 4.1E-02 | na | -- | 8.3E-02 | 4.1E-02 | na | -- | -- | -- | -- | -- | 8.3E-02 | 4.1E-02 | na |
| Chromium III | 0 | 1.8E+03 | 2.3E+02 | na | -- | 1.8E+03 | 2.3E+02 | na | -- | -- | -- | -- | -- | 1.8E+03 | 2.3E+02 | na |
| Chromium VI | 0 | 1.8E+01 | 1.1E+01 | na | -- | 1.8E+01 | 1.1E+01 | na | -- | -- | -- | -- | -- | 1.8E+01 | 1.1E+01 | na |
| Chromium, Total | 0 | -- | -- | na | -- | -- | -- | na | -- | -- | -- | -- | -- | -- | -- | na |
| Chrysene ^c | 0 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | -- | -- | -- | -- | na |
| Copper | 0 | 5.0E+01 | 2.9E+01 | na | -- | 5.0E+01 | 2.9E+01 | na | -- | -- | -- | -- | -- | 5.0E+01 | 2.9E+01 | na |
| Cyanide | 0 | 2.2E+01 | 5.2E+00 | na | 2.2E+05 | 2.2E+01 | 5.2E+00 | na | 2.2E+05 | 2.2E+01 | 5.2E+00 | na | 2.2E+05 | 2.2E+01 | 5.2E+00 | na |
| DDD ^c | 0 | -- | -- | na | 8.4E-03 | -- | -- | na | 8.4E-03 | -- | -- | -- | -- | -- | -- | na |
| DDE ^c | 0 | -- | -- | na | 5.9E-03 | -- | -- | na | 5.9E-03 | -- | -- | -- | -- | -- | -- | na |
| DDT ^c | 0 | 1.1E+00 | 1.0E-03 | na | 5.9E-03 | 1.1E+00 | 1.0E-03 | na | 5.9E-03 | -- | -- | -- | -- | 1.1E+00 | 1.0E-03 | na |
| Demeton | 0 | -- | 1.0E-01 | na | -- | -- | 1.0E-01 | na | -- | -- | -- | -- | -- | -- | 1.0E-01 | na |
| Dibenz(a,h)anthracene ^c | 0 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | -- | -- | -- | -- | na |
| Dibutyl phthalate | 0 | -- | -- | na | 1.2E+04 | -- | -- | na | 1.2E+04 | -- | -- | -- | -- | -- | -- | na |
| Dichloromethane | 0 | -- | -- | na | 1.6E+04 | -- | -- | na | 1.6E+04 | -- | -- | -- | -- | -- | -- | na |
| (Methylene Chloride) ^c | 0 | -- | -- | na | 1.7E+04 | -- | -- | na | 1.7E+04 | -- | -- | -- | -- | -- | -- | na |
| 1,2-Dichlorobenzene | 0 | -- | -- | na | 2.6E+03 | -- | -- | na | 2.6E+03 | -- | -- | -- | -- | -- | -- | na |
| 1,3-Dichlorobenzene | 0 | -- | -- | na | 2.6E+03 | -- | -- | na | 2.6E+03 | -- | -- | -- | -- | -- | -- | na |
| 1,4-Dichlorobenzene | 0 | -- | -- | na | 7.7E-01 | -- | -- | na | 7.7E-01 | -- | -- | -- | -- | -- | -- | na |
| 3,3-Dichlorobenzidine ^c | 0 | -- | -- | na | 4.8E+02 | -- | -- | na | 4.8E+02 | -- | -- | -- | -- | -- | -- | na |
| Dichlorobromomethane ^c | 0 | -- | -- | na | 9.9E+02 | -- | -- | na | 9.9E+02 | -- | -- | -- | -- | -- | -- | na |
| 1,2-Dichloroethane ^c | 0 | -- | -- | na | 1.7E+04 | -- | -- | na | 1.7E+04 | -- | -- | -- | -- | -- | -- | na |
| 1,1-Dichloroethylene | 0 | -- | -- | na | 1.4E+05 | -- | -- | na | 1.4E+05 | -- | -- | -- | -- | -- | -- | na |
| 1,2-trans-dichloroethylene | 0 | -- | -- | na | 7.9E+02 | -- | -- | na | 7.9E+02 | -- | -- | -- | -- | -- | -- | na |
| 2,4-Dichlorophenol | 0 | -- | -- | na | -- | -- | -- | na | -- | -- | -- | -- | -- | -- | -- | na |
| 2,4-Dichlorophenoxy | 0 | -- | -- | na | 3.9E+02 | -- | -- | na | 3.9E+02 | -- | -- | -- | -- | -- | -- | na |
| acetic acid (2,4-D) | 0 | -- | -- | na | 1.7E+03 | -- | -- | na | 1.7E+03 | -- | -- | -- | -- | -- | -- | na |
| 1,2-Dichloropropane ^c | 0 | -- | -- | na | 1.4E+03 | 2.4E-01 | 5.6E-02 | na | 1.4E+03 | -- | -- | -- | -- | 2.4E-01 | 5.6E-02 | na |
| Dieldrin ^c | 0 | 2.4E-01 | 5.6E-02 | na | 1.2E+05 | -- | -- | na | 1.2E+05 | -- | -- | -- | -- | -- | -- | na |
| Diethyl Phthalate | 0 | -- | -- | na | 5.9E+01 | -- | -- | na | 5.9E+01 | -- | -- | -- | -- | -- | -- | na |
| Di-2-Ethylhexyl Phthalate ^c | 0 | -- | -- | na | 2.3E+03 | -- | -- | na | 2.3E+03 | -- | -- | -- | -- | -- | -- | na |
| 2,4-Dimethylphenol | 0 | -- | -- | na | 2.9E+06 | -- | -- | na | 2.9E+06 | -- | -- | -- | -- | -- | -- | na |
| Dimethyl Phthalate | 0 | -- | -- | na | 1.2E+04 | -- | -- | na | 1.2E+04 | -- | -- | -- | -- | -- | -- | na |
| Di-n-Butyl Phthalate | 0 | -- | -- | na | 1.4E+04 | -- | -- | na | 1.4E+04 | -- | -- | -- | -- | -- | -- | na |
| 2,4 Dinitrophenol | 0 | -- | -- | na | 7.65E+02 | -- | -- | na | 7.65E+02 | -- | -- | -- | -- | -- | -- | na |
| 2-Methyl-4-6-Dinitrophenol | 0 | -- | -- | na | 9.1E+01 | -- | -- | na | 9.1E+01 | -- | -- | -- | -- | -- | -- | na |
| 2,4-Dinitrotoluene ^c | 0 | -- | -- | na | -- | -- | -- | na | -- | -- | -- | -- | -- | -- | -- | na |
| Dioxin (2,3,7,8- tetrachlorodibenzo-p-dioxin) | 0 | -- | -- | na | 1.2E-06 | -- | -- | na | 1.2E-06 | -- | -- | -- | -- | -- | -- | na |
| (ppb) | 0 | -- | -- | na | 5.4E+00 | -- | -- | na | 5.4E+00 | -- | -- | -- | -- | -- | -- | na |
| 1,2-Diphenylhydrazine ^c | 0 | 2.2E-01 | 5.6E-02 | na | 2.4E+02 | 2.2E-01 | 5.6E-02 | na | 2.4E+02 | -- | -- | -- | -- | 2.2E-01 | 5.6E-02 | na |
| Alpha-Endosulfan | 0 | 2.2E-01 | 5.6E-02 | na | 2.4E+02 | 2.2E-01 | 5.6E-02 | na | 2.4E+02 | -- | -- | -- | -- | 2.2E-01 | 5.6E-02 | na |
| Beta-Endosulfan | 0 | -- | -- | na | 2.4E+02 | -- | -- | na | 2.4E+02 | -- | -- | -- | -- | -- | -- | na |
| Endosulfan Sulfate | 0 | 8.6E-02 | 3.6E-02 | na | 8.1E-01 | 8.6E-02 | 3.6E-02 | na | 8.1E-01 | -- | -- | -- | -- | 8.6E-02 | 3.6E-02 | na |
| Endrin | 0 | -- | -- | na | 8.1E-01 | -- | -- | na | 8.1E-01 | -- | -- | -- | -- | -- | -- | na |
| Endrin Aldehyde | 0 | -- | -- | na | 8.1E-01 | -- | -- | na | 8.1E-01 | -- | -- | -- | -- | -- | -- | na |

| Parameter (ug/l unless noted) | Background Conc. | Water Quality Criteria | | | Wasteload Allocations | | | Antidegradation Baseline | | | Antidegradation Allocations | | | Most Limiting Allocations | | |
|--|---------------------|------------------------|---------|----------|-----------------------|---------|---------|--------------------------|---------|---------|-----------------------------|----------|---------|---------------------------|---------|----------|
| | | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) |
| Ethylbenzene | 0 | -- | -- | na | 2.9E+04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.9E+04 |
| Fluoranthene | 0 | -- | -- | na | 3.7E+02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.7E+02 |
| Fluorene | 0 | -- | -- | na | 1.4E+04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.4E+04 |
| Foaming Agents | 0 | -- | -- | na | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Guthion | 0 | -- | 1.0E-02 | na | -- | -- | 1.0E-02 | na | -- | -- | -- | -- | -- | -- | 1.0E-02 | na |
| Heptachlor ^c | 0 | 5.2E-01 | 3.8E-03 | na | 2.1E-03 | 5.2E-01 | 3.8E-03 | na | 2.1E-03 | 5.2E-01 | 3.8E-03 | na | 2.1E-03 | 5.2E-01 | 3.8E-03 | na |
| Heptachlor Epoxide ^c | 0 | 5.2E-01 | 3.8E-03 | na | 1.1E-03 | 5.2E-01 | 3.8E-03 | na | 1.1E-03 | 5.2E-01 | 3.8E-03 | na | 1.1E-03 | 5.2E-01 | 3.8E-03 | na |
| Hexachlorobenzene ^c | 0 | -- | -- | na | 7.7E-03 | -- | -- | na | 7.7E-03 | -- | -- | na | 7.7E-03 | -- | -- | 7.7E-03 |
| Hexachlorobutadiene ^c | 0 | -- | -- | na | 5.0E+02 | -- | -- | na | 5.0E+02 | -- | -- | na | 5.0E+02 | -- | -- | 5.0E+02 |
| Hexachlorocyclohexane | 0 | -- | -- | na | 1.3E-01 | -- | -- | na | 1.3E-01 | -- | -- | na | 1.3E-01 | -- | -- | 1.3E-01 |
| Alpha-BHC ^c | 0 | -- | -- | na | 4.8E-01 | -- | -- | na | 4.8E-01 | -- | -- | na | 4.8E-01 | -- | -- | 4.8E-01 |
| Beta-BHC ^c | 0 | 9.5E-01 | na | na | 6.3E-01 | 9.5E-01 | -- | na | 6.3E-01 | -- | -- | na | 6.3E-01 | 9.5E-01 | -- | 6.3E-01 |
| Gamma-BHC ^c (Lindane) | 0 | -- | -- | na | 1.7E+04 | -- | -- | na | 1.7E+04 | -- | -- | na | 1.7E+04 | -- | -- | 1.7E+04 |
| Hexachlorocyclopentadiene | 0 | -- | -- | na | 8.9E+01 | -- | -- | na | 8.9E+01 | -- | -- | na | 8.9E+01 | -- | -- | 8.9E+01 |
| Hexachloroethane ^c | 0 | -- | 2.0E+00 | na | -- | -- | 2.0E+00 | na | -- | -- | -- | na | -- | -- | 2.0E+00 | na |
| Hydrogen Sulfide | 0 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | na | 4.9E-01 | -- | -- | 4.9E-01 |
| Indeno (1,2,3-cd) pyrene ^c | 0 | -- | -- | na | -- | -- | -- | na | -- | -- | -- | na | -- | -- | -- | -- |
| Iron | 0 | -- | -- | na | 2.8E+04 | -- | -- | na | 2.8E+04 | -- | -- | na | 2.8E+04 | -- | -- | 2.8E+04 |
| Isophorone ^c | 0 | -- | 0.0E+00 | na | -- | -- | 0.0E+00 | na | -- | -- | -- | na | -- | -- | 0.0E+00 | na |
| Kepone | 0 | 6.9E+02 | 7.9E+01 | na | -- | 6.9E+02 | 7.9E+01 | na | -- | 6.9E+02 | 7.9E+01 | na | -- | 6.9E+02 | 7.9E+01 | na |
| Lead | 0 | -- | 1.0E-01 | na | -- | -- | 1.0E-01 | na | -- | -- | -- | na | -- | -- | 1.0E-01 | na |
| Malathion | 0 | -- | -- | na | -- | -- | -- | na | -- | -- | -- | na | -- | -- | -- | -- |
| Manganese | 0 | 1.4E+00 | 7.7E-01 | na | 5.1E-02 | 1.4E+00 | 7.7E-01 | na | 5.1E-02 | 1.4E+00 | 7.7E-01 | na | 5.1E-02 | 1.4E+00 | 7.7E-01 | na |
| Mercury | 0 | -- | -- | na | 4.0E+03 | -- | -- | na | 4.0E+03 | -- | -- | na | 4.0E+03 | -- | -- | 4.0E+03 |
| Methyl Bromide | 0 | -- | 3.0E-02 | na | -- | -- | 3.0E-02 | na | -- | -- | -- | na | -- | -- | 3.0E-02 | na |
| Methoxychlor | 0 | -- | 0.0E+00 | na | -- | -- | 0.0E+00 | na | -- | -- | -- | na | -- | -- | 0.0E+00 | na |
| Mirex | 0 | 5.9E+02 | 6.5E+01 | na | 2.1E+04 | 5.9E+02 | 6.5E+01 | na | 2.1E+04 | 5.9E+02 | 6.5E+01 | na | 2.1E+04 | 5.9E+02 | 6.5E+01 | na |
| Monochlorobenzene | 0 | -- | -- | na | 4.6E+03 | -- | -- | na | 4.6E+03 | -- | -- | na | 4.6E+03 | -- | -- | 4.6E+03 |
| Nickel | 0 | -- | -- | na | 1.9E+03 | -- | -- | na | 1.9E+03 | -- | -- | na | 1.9E+03 | -- | -- | 1.9E+03 |
| Nitrate (as N) | 0 | -- | -- | na | 8.1E+01 | -- | -- | na | 8.1E+01 | -- | -- | na | 8.1E+01 | -- | -- | 8.1E+01 |
| Nitrobenzene | 0 | -- | -- | na | 1.6E+02 | -- | -- | na | 1.6E+02 | -- | -- | na | 1.6E+02 | -- | -- | 1.6E+02 |
| N-Nitrosodimethylamine ^c | 0 | -- | -- | na | 1.4E+01 | -- | -- | na | 1.4E+01 | -- | -- | na | 1.4E+01 | -- | -- | 1.4E+01 |
| N-Nitrosodiphenylamine ^c | 0 | 6.5E-02 | 1.3E-02 | na | -- | 6.5E-02 | 1.3E-02 | na | -- | 6.5E-02 | 1.3E-02 | na | -- | 6.5E-02 | 1.3E-02 | na |
| N-Nitrosodi-n-propylamine ^c | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| Parathion | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB-1016 | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB-1221 | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB-1232 | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB-1242 | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB-1248 | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB-1254 | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB-1260 | 0 | -- | 1.4E-02 | na | -- | -- | 1.4E-02 | na | -- | -- | -- | na | -- | -- | 1.4E-02 | na |
| PCB Total ^c | 0 | -- | -- | na | 1.7E-03 | -- | -- | na | 1.7E-03 | -- | -- | na | 1.7E-03 | -- | -- | 1.7E-03 |

| Parameter (ug/l unless noted) | Background Conc. | Water Quality Criteria | | | Wasteload Allocations | | | Antidegradation Baseline | | | Antidegradation Allocations | | | Most Limiting Allocations | | |
|--|---------------------|------------------------|---------|----------|-----------------------|---------|---------|--------------------------|---------|-------|-----------------------------|----------|----|---------------------------|---------|----------|
| | | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) | HH | Acute | Chronic | HH (PWS) |
| Pentachlorophenol ^c | 0 | 8.7E+00 | 6.7E+00 | na | 8.2E+01 | 8.7E+00 | 6.7E+00 | na | 8.2E+01 | - | - | - | - | 8.7E+00 | 6.7E+00 | na |
| Phenol | 0 | - | - | na | 4.6E+06 | - | - | na | 4.6E+06 | - | - | - | - | - | - | na |
| Pyrene | 0 | - | - | na | 1.1E+04 | - | - | na | 1.1E+04 | - | - | - | - | - | - | na |
| Radionuclides (pCi/l except Beta/Photon) | 0 | - | - | na | - | - | - | na | - | - | - | - | - | - | - | na |
| Gross Alpha Activity (Bq/l) | 0 | - | - | na | 1.5E+01 | - | - | na | 1.5E+01 | - | - | - | - | - | - | na |
| Gross Beta Activity (Bq/l) | 0 | - | - | na | 4.0E+00 | - | - | na | 4.0E+00 | - | - | - | - | - | - | na |
| Beta and Photon Activity (Bq/l) | 0 | - | - | na | 8.0E+00 | - | - | na | 8.0E+00 | - | - | - | - | - | - | na |
| Sr-90 | 0 | - | - | na | 2.0E+04 | - | - | na | 2.0E+04 | - | - | - | - | - | - | na |
| Tritium | 0 | 2.0E+01 | 5.0E+00 | na | 1.1E+04 | 2.0E+01 | 5.0E+00 | na | 1.1E+04 | - | - | - | - | 2.0E+01 | 5.0E+00 | na |
| Selenium | 0 | 3.7E+01 | - | na | - | 3.7E+01 | - | na | - | - | - | - | - | 3.7E+01 | - | na |
| Sulfate | 0 | - | - | na | - | - | - | na | - | - | - | - | - | - | - | na |
| 1,1,2,2-Tetrachloroethane ^c | 0 | - | - | na | 1.1E+02 | - | - | na | 1.1E+02 | - | - | - | - | - | - | na |
| Tetrachloroethylene ^c | 0 | - | - | na | 8.9E+01 | - | - | na | 8.9E+01 | - | - | - | - | - | - | na |
| Thallium | 0 | - | - | na | 6.3E+00 | - | - | na | 6.3E+00 | - | - | - | - | - | - | na |
| Toluene | 0 | - | - | na | 2.0E+05 | - | - | na | 2.0E+05 | - | - | - | - | - | - | na |
| Total dissolved solids | 0 | - | - | na | - | - | - | na | - | - | - | - | - | - | - | na |
| Toxaphene ^c | 0 | 7.3E-01 | 2.0E-04 | na | 7.5E-03 | 7.3E-01 | 2.0E-04 | na | 7.5E-03 | - | - | - | - | 7.3E-01 | 2.0E-04 | na |
| Triphenyltin | 0 | 4.6E-01 | 6.3E-02 | na | - | 4.6E-01 | 6.3E-02 | na | - | - | - | - | - | 4.6E-01 | 6.3E-02 | na |
| 1,2,4-Trichlorobenzene | 0 | - | - | na | 9.4E+02 | - | - | na | 9.4E+02 | - | - | - | - | - | - | na |
| 1,1,2-Trichloroethane ^c | 0 | - | - | na | 4.2E+02 | - | - | na | 4.2E+02 | - | - | - | - | - | - | na |
| Trichloroethylene ^c | 0 | - | - | na | 8.1E+02 | - | - | na | 8.1E+02 | - | - | - | - | - | - | na |
| 2,4,6-Trichlorophenol ^c | 0 | - | - | na | 6.5E+01 | - | - | na | 6.5E+01 | - | - | - | - | - | - | na |
| 2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex) | 0 | - | - | na | - | - | - | na | - | - | - | - | - | - | - | na |
| Vinyl Chloride ^c | 0 | - | - | na | - | - | - | na | - | - | - | - | - | - | - | na |
| Zinc | 0 | 3.8E+02 | 3.8E+02 | na | 6.9E+04 | 3.8E+02 | 3.8E+02 | na | 6.9E+04 | - | - | - | - | 3.8E+02 | 3.8E+02 | na |

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for industries and design flow for Municipalities
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WQAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WQAs are based upon a complete mix.
Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WQAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

| Metal | Target Value (SSTV) |
|--------------|---------------------|
| Antimony | 4.3E+03 |
| Arsenic | 9.0E+01 |
| Barium | na |
| Cadmium | 2.0E+00 |
| Chromium III | 1.4E+02 |
| Chromium VI | 6.4E+00 |
| Copper | 1.8E+01 |
| Iron | na |
| Lead | 4.7E+01 |
| Manganese | na |
| Mercury | 5.1E-02 |
| Nickel | 3.9E+01 |
| Selenium | 3.0E+00 |
| Silver | 1.5E+01 |
| Zinc | 1.5E+02 |

Note: do not use CL's lower than the minimum CL's provided in agency guidance

Facility = Grange Hall Elementary School
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 12
WLAc = 1.2
Q.L. = 1
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average = 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 2.42120411209957
Average Weekly Limit = 2.42120411209957
Average Monthly Limit = 2.42120411209957

The data are:

9

A concentration of 9 mg/L was used to force a limitation per Guidance Memorandum 00-2011. The limitations indicated above are greater than the ammonia limitations in the current permit. Because anti-backsliding rules prohibit the relaxation of limitations, the current limitations of 1.1 mg/L monthly and weekly average will remain in the permit.

Facility = Grange Hall Elementary School
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 19
WLAc = 11
Q.L. = 1
samples/mo. = 30
samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 20000
Variance = 1440000
C.V. = 0.6
97th percentile daily values = 48668.3
97th percentile 4 day average = 33275.8
97th percentile 30 day average = 24121.0
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 16.0883226245855
Average Weekly limit = 9.59676626920107
Average Monthly Limit = 7.9737131838758

The data are:

20000

A concentration of 20,000 µg/L was used to force a limitation per Guidance Memorandum 00-2011. The above limitations are the same as in the current permit (monthly and weekly averages).

Attachment H


Stream Sanitation Analysis

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Water Regional Office*

4949-A Cox Road, Glen Allen, VA 23060-6296

804/527-5020

SUBJECT: Stream Sanitation Analysis – Grange Hall Elementary STP (VA0020222)
TO: Curt Linderman, Water Permits Manager
FROM: Jennifer Palmore, Environmental Engineer Senior 
DATE: July 7, 2003
COPIES: Gina Ebbett, Ray Jenkins, Model File

A stream sanitation analysis was received on June 13th for the Grange Hall Elementary School STP. The facility is currently permitted to discharge to the headwaters of Sappony Creek, in Chesterfield County. The analysis was requested because the facility is going to be permitted for a higher design flow.

A site visit was performed on July 1st. At the point of discharge the stream is considered intermittent on the USGS Clayville topo quad (segment 1). The stream becomes perennial approximately 1 mile downstream (segment 2). Access to the perennial portion of the stream could not be obtained. As there were no major tributaries that entered between the stream at the discharge point and the perennial point, the perennial stream segment was assumed to have the same characteristics as the upstream segment.

The stream was modeled using Regional Model 4.1. The model was first run with the currently permitted flow and permit limits to set the background conditions. The model predicted that at the current flow, the water quality standard for dissolved oxygen was violated in segment 1 and was predicted to drop to as low as 6.054 mg/L in segment 2. Therefore, both segments were considered Tier 1 and antidegradation was not applied.

The model was rerun with the increased flow. The model predicts that the average daily dissolved oxygen water quality standard will be maintained under 7Q10 conditions in both segments if the following effluent limits are applied:

| | |
|---------------------|-----------|
| Flow: | 0.016 MGD |
| cBOD ₅ : | 16 mg/L |
| TKN: | 3 mg/L |
| Dissolved oxygen: | 6 mg/L |

The model documentation is attached for reference. If you have any questions, please feel free to contact me.

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SAPPONY CREEK.

Current Combines

File Information

File Name: E:\models\Grange Hall Elementary - current discharge.mod
Date Modified: July 03, 2003

Water Quality Standards Information

Stream Name: SAPPONY CREEK
River Basin: James River Basin
Section: 6
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: NEW-2

Background Flow Information

Gauge Used: 02041000 Deep Creek near Mannboro
Gauge Drainage Area: 158 Sq.Mi.
Gauge 7Q10 Flow: 0.8402 MGD
Headwater Drainage Area: 0 Sq.Mi.
Headwater 7Q10 Flow: 0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 5.317722E-03 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 24.5 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.487655 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 286 ft above MSL
Model End Elevation: 193 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SAPPONY CREEK.

Segment Information for Segment 1

Definition Information

| | |
|---------------------|-----------------------------------|
| Segment Definition: | A discharge enters. |
| Discharge Name: | GRANGE HALL ELEMENTARY SCHOOL STP |
| VPDES Permit No.: | VA0020222 |

Discharger Flow Information

| | |
|--------------|--------------|
| Flow: | 0.0066 MGD |
| cBOD5: | 20 mg/l |
| TKN: | 3 mg/l |
| D.O.: | 6 mg/l |
| Temperature: | 26 Degrees C |

Geographic Information

| | |
|---------------------------|-------------|
| Segment Length: | 0.94 miles |
| Upstream Drainage Area: | 0 Sq.Mi. |
| Downstream Drainage Area: | 0.89 Sq.Mi. |
| Upstream Elevation: | 286 Ft. |
| Downstream Elevation: | 230 Ft. |

Hydraulic Information

| | |
|-------------------|--|
| Segment Width: | 1 Ft. |
| Segment Depth: | 0.04 Ft. |
| Segment Velocity: | 0.252 Ft./Sec. |
| Segment Flow: | 0.01 MGD |
| Incremental Flow: | 0.005 MGD (Applied at end of segment.) |

Channel Information

| | |
|------------------|-----------------------|
| Cross Section: | Rectangular |
| Character: | Moderately Meandering |
| Pool and Riffle: | No |
| Bottom Type: | Sand |
| Sludge: | None |
| Plants: | None |
| Algae: | None |

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SAPPONY CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition: A significant change occurs.

Geographic Information

Segment Length: 1.68 miles
Upstream Drainage Area: 0.89 Sq.Mi.
Downstream Drainage Area: 2.44 Sq.Mi.
Upstream Elevation: 230 Ft.
Downstream Elevation: 193 Ft.

Hydraulic Information

Segment Width: 1 Ft.
Segment Depth: 0.067 Ft.
Segment Velocity: 0.208 Ft./Sec.
Segment Flow: 0.007 MGD
Incremental Flow: 0.008 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Moderately Meandering
Pool and Riffle: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

modout
"Model Run For E:\models\Grange Hall Elementary - current discharge.mo
d On 7/3/03 4:36:48 PM"

"Model is for SAPPONY CREEK."

"Model starts at the GRANGE HALL ELEMENTARY SCHOOL STP discharge."

"Background Data"

| "7Q10" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| 0, | 2, | 0, | 7.488, | 24.5 |

Grant

"Discharge/Tributary Input Data for Segment 1"

| "Flow" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .0066, | 20, | 3, | .6, | 26 |

"Hydraulic Information for Segment 1"

| "Length" | "Width" | "Depth" | "Velocity" |
|----------|---------|---------|------------|
| "(mi)" | "(ft)" | "(ft)" | "(ft/sec)" |
| .94, | 1, | .04, | .252 |

"Initial Mix Values for Segment 1"

| "Flow" | "DO" | "cBOD" | "nBOD" | "DOSat" | "Temp" |
|---------|----------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .0066, | 6, | 50, | 0, | 8.128, | 26 |

"Rate Constants for Segment 1. - (All units Per Day)"

| "k1" | "k1@T" | "k2" | "k2@T" | "kn" | "kn@T" | "BD" | "BD@T" |
|------|--------|------|---------|------|--------|------|--------|
| 1.6, | 2.108, | 20, | 23.058, | .35, | .555, | 0, | 0 |

"Output for Segment 1"

"Segment starts at GRANGE HALL ELEMENTARY SCHOOL STP"

"Total", "Segm."

| "Dist." | "Dist." | "DO" | "cBOD" | "nBOD" |
|---------|---------|----------|----------|----------|
| "(mi)" | "(mi)" | "(mg/l)" | "(mg/l)" | "(mg/l)" |

| | | | | |
|------|------|--------|---------|---|
| 0, | 0, | 6, | 50, | 0 |
| .1, | .1, | 5.008, | 47.509, | 0 |
| .2, | .2, | 4.536, | 45.142, | 0 |
| .3, | .3, | 4.356, | 42.893, | 0 |
| .4, | .4, | 4.339, | 40.756, | 0 |
| .5, | .5, | 4.41, | 38.725, | 0 |
| .6, | .6, | 4.528, | 36.795, | 0 |
| .7, | .7, | 4.669, | 34.962, | 0 |
| .8, | .8, | 4.819, | 33.22, | 0 |
| .9, | .9, | 4.972, | 31.565, | 0 |
| .94, | .94, | 5.032, | 30.926, | 0 |

"!!!THE WATER QUALITY STANDARD IS VIOLATED IN SEGMENT 1!!!"

modout

"Discharge/Tributary Input Data for Segment 2"

| "Flow" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| 0, | 0, | 0, | 0, | 0 |

"Incremental Flow Input Data for Segment 2"

| "Flow" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .005, | 2, | 0, | 7.404, | 24.5 |

"Hydraulic Information for Segment 2"

| "Length" | "Width" | "Depth" | "Velocity" |
|----------|---------|---------|------------|
| "(mi)" | "(ft)" | "(ft)" | "(ft/sec)" |
| 1.68, | 1, | .067, | .208 |

"Initial Mix Values for Segment 2"

| "Flow" | "DO" | "cBOD" | "nBOD" | "DOSat" | "Temp" |
|---------|----------|----------|----------|----------|----------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .0116, | 6.054, | 19.751, | 0, | 8.226, | 25.35345 |

"Rate Constants for Segment 2. - (All units Per Day)"

| "k1" | "k1@T" | "k2" | "k2@T" | "kn" | "kn@T" | "BD" | "BD@T" |
|------|--------|---------|---------|------|--------|------|--------|
| 1.2, | 1.534, | 13.214, | 15.003, | .35, | .528, | 0, | 0 |

"Output for Segment 2"

"Segment starts at "

"Total", "Segm."

| "Dist." | "Dist." | "DO" | "cBOD" | "nBOD" |
|---------|---------|----------|----------|----------|
| "(mi)" | "(mi)" | "(mg/l)" | "(mg/l)" | "(mg/l)" |

| | | | | |
|-------|-------|--------|---------|---|
| .94, | 0, | 6.054, | 19.751, | 0 |
| 1.04, | .1, | 6.125, | 18.88, | 0 |
| 1.14, | .2, | 6.202, | 18.048, | 0 |
| 1.24, | .3, | 6.281, | 17.252, | 0 |
| 1.34, | .4, | 6.36, | 16.491, | 0 |
| 1.44, | .5, | 6.438, | 15.764, | 0 |
| 1.54, | .6, | 6.514, | 15.069, | 0 |
| 1.64, | .7, | 6.588, | 14.405, | 0 |
| 1.74, | .8, | 6.659, | 13.77, | 0 |
| 1.84, | .9, | 6.728, | 13.163, | 0 |
| 1.94, | 1, | 6.794, | 12.583, | 0 |
| 2.04, | 1.1, | 6.857, | 12.028, | 0 |
| 2.14, | 1.2, | 6.917, | 11.498, | 0 |
| 2.24, | 1.3, | 6.974, | 10.991, | 0 |
| 2.34, | 1.4, | 7.029, | 10.506, | 0 |
| 2.44, | 1.5, | 7.082, | 10.043, | 0 |
| 2.54, | 1.6, | 7.132, | 9.6, | 0 |
| 2.62, | 1.68, | 7.171, | 9.26, | 0 |

modout

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to SAPPONY CREEK.**

File Information

File Name: E:\models\Grange Hall Elementary.mod
Date Modified: July 03, 2003

Water Quality Standards Information

Stream Name: SAPPONY CREEK
River Basin: James River Basin
Section: 6
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: NEW-2

Background Flow Information

Gauge Used: 02041000 Deep Creek near Mannboro
Gauge Drainage Area: 158 Sq.Mi.
Gauge 7Q10 Flow: 0.8402 MGD
Headwater Drainage Area: 0 Sq.Mi.
Headwater 7Q10 Flow: 0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow In Segments: 5.317722E-03 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 24.5 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.487655 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 286 ft above MSL
Model End Elevation: 193 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SAPPONY CREEK.

Segment Information for Segment 1

Definition Information

| | |
|---------------------|-----------------------------------|
| Segment Definition: | A discharge enters. |
| Discharge Name: | GRANGE HALL ELEMENTARY SCHOOL STP |
| VPDES Permit No.: | VA0020222 |

Discharger Flow Information

| | |
|--------------|--------------|
| Flow: | 0.016 MGD |
| cBOD5: | 16 mg/l |
| TKN: | 3 mg/l |
| D.O.: | 6 mg/l |
| Temperature: | 26 Degrees C |

Geographic Information

| | |
|---------------------------|-------------|
| Segment Length: | 0.94 miles |
| Upstream Drainage Area: | 0 Sq.Mi. |
| Downstream Drainage Area: | 0.89 Sq.Mi. |
| Upstream Elevation: | 286 Ft. |
| Downstream Elevation: | 230 Ft. |

Hydraulic Information

| | |
|-------------------|--|
| Segment Width: | 1.329 Ft. |
| Segment Depth: | 0.058 Ft. |
| Segment Velocity: | 0.32 Ft./Sec. |
| Segment Flow: | 0.016 MGD |
| Incremental Flow: | 0.005 MGD (Applied at end of segment.) |

Channel Information

| | |
|------------------|-----------------------|
| Cross Section: | Rectangular |
| Character: | Moderately Meandering |
| Pool and Riffle: | No |
| Bottom Type: | Sand |
| Sludge: | None |
| Plants: | None |
| Algae: | None |

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SAPPONY CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition: A significant change occurs.

Geographic Information

Segment Length: 1.68 miles
Upstream Drainage Area: 0.89 Sq.Mi.
Downstream Drainage Area: 2.44 Sq.Mi.
Upstream Elevation: 230 Ft.
Downstream Elevation: 193 Ft.

Hydraulic Information

Segment Width: 1.33 Ft.
Segment Depth: 0.076 Ft.
Segment Velocity: 0.23 Ft./Sec.
Segment Flow: 0.016 MGD
Incremental Flow: 0.008 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Moderately Meandering
Pool and Riffle: No
Bottom Type: Sand
Sludge: None
Plants: None
Algae: None

modout

"Model Run For E:\models\Grange Hall Elementary.mod On 7/3/03 3:45:45 PM"

"Model is for SAPPONY CREEK."

"Model starts at the GRANGE HALL ELEMENTARY SCHOOL STP discharge."

"Background Data"

| "7Q10" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| 0, | 2, | 0, | 7.488, | 24.5 |

"Discharge/Tributary Input Data for Segment 1"

| "Flow" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .016, | 16, | 3, | 6, | 26 |

"Hydraulic Information for Segment 1"

| "Length" | "Width" | "Depth" | "Velocity" |
|----------|---------|---------|------------|
| "(mi)" | "(ft)" | "(ft)" | "(ft/sec)" |
| .94, | 1.329, | .058, | .32 |

"Initial Mix Values for Segment 1"

| "Flow" | "DO" | "cBOD" | "nBOD" | "DOSat" | "Temp" |
|---------|----------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .016, | 6, | 40, | 0, | 8.128, | 26 |

"Rate Constants for Segment 1. - (All units Per Day)"

| "k1" | "k1@T" | "k2" | "k2@T" | "kn" | "kn@T" | "BD" | "BD@T" |
|------|--------|------|---------|------|--------|------|--------|
| 1.6, | 2.108, | 20, | 23.058, | .35, | .555, | 0, | 0 |

"Output for Segment 1"

"Segment starts at GRANGE HALL ELEMENTARY SCHOOL STP"

"Total", "Segm."

| "Dist." | "Dist." | "DO" | "cBOD" | "nBOD" |
|---------|---------|----------|----------|----------|
| "(mi)" | "(mi)" | "(mg/l)" | "(mg/l)" | "(mg/l)" |
| 0, | 0, | 6, | 40, | 0 |
| .1, | .1, | 5.484, | 38.422, | 0 |
| .2, | .2, | 5.202, | 36.906, | 0 |
| .3, | .3, | 5.068, | 35.45, | 0 |
| .4, | .4, | 5.028, | 34.051, | 0 |
| .5, | .5, | 5.047, | 32.708, | 0 |
| .6, | .6, | 5.102, | 31.418, | 0 |
| .7, | .7, | 5.179, | 30.179, | 0 |
| .8, | .8, | 5.268, | 28.988, | 0 |
| .9, | .9, | 5.363, | 27.844, | 0 |
| .94, | .94, | 5.402, | 27.399, | 0 |

"Discharge/Tributary Input Data for Segment 2"

modout

| | | | | |
|----------|-----------|-----------|-----------|---------|
| "Flow", | "cBOD5", | "TKN", | "DO", | "Temp" |
| "(mgd)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "deg C" |
| 0, | 0, | 0, | 0, | 0 |

"Incremental Flow Input Data for Segment 2"

| | | | | |
|----------|-----------|-----------|-----------|---------|
| "Flow", | "cBOD5", | "TKN", | "DO", | "Temp" |
| "(mgd)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "deg C" |
| .005, | 2, | 0, | 7.369, | 24.5 |

"Hydraulic Information for Segment 2"

| | | | |
|-----------|----------|----------|------------|
| "Length", | "Width", | "Depth", | "Velocity" |
| "(mi)", | "(ft)", | "(ft)", | "(ft/sec)" |
| 1.68, | 1.33, | .076, | .23 |

"Initial Mix Values for Segment 2"

| | | | | | |
|----------|-----------|-----------|-----------|-----------|----------|
| "Flow", | "DO", | "cBOD", | "nBOD", | "DOSat", | "Temp" |
| "(mgd)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "deg C" |
| .021, | 5.87, | 22.066, | 0, | 8.188, | 25.64286 |

"Rate Constants for Segment 2. - (All units Per Day)"

| | | | | | | | |
|-------|---------|---------|---------|-------|---------|-------|--------|
| "k1", | "k1@T", | "k2", | "k2@T", | "kn", | "kn@T", | "BD", | "BD@T" |
| 1.4, | 1.814, | 13.214, | 15.107, | .35, | .54, | 0, | 0 |

"Output for Segment 2"

"Segment starts at "

"Total", "Segm."

| | | | | |
|----------|----------|-----------|-----------|----------|
| "Dist.", | "Dist.", | "DO", | "cBOD", | "nBOD" |
| "(mi)", | "(mi)", | "(mg/l)", | "(mg/l)", | "(mg/l)" |
| .94, | 0, | 5.87, | 22.066, | 0 |
| 1.04, | .1, | 5.782, | 21.028, | 0 |
| 1.14, | .2, | 5.764, | 20.038, | 0 |
| 1.24, | .3, | 5.79, | 19.095, | 0 |
| 1.34, | .4, | 5.844, | 18.196, | 0 |
| 1.44, | .5, | 5.915, | 17.34, | 0 |
| 1.54, | .6, | 5.995, | 16.524, | 0 |
| 1.64, | .7, | 6.081, | 15.746, | 0 |
| 1.74, | .8, | 6.168, | 15.005, | 0 |
| 1.84, | .9, | 6.255, | 14.299, | 0 |
| 1.94, | 1, | 6.341, | 13.626, | 0 |
| 2.04, | 1.1, | 6.424, | 12.985, | 0 |
| 2.14, | 1.2, | 6.505, | 12.374, | 0 |
| 2.24, | 1.3, | 6.583, | 11.792, | 0 |
| 2.34, | 1.4, | 6.657, | 11.237, | 0 |
| 2.44, | 1.5, | 6.728, | 10.708, | 0 |
| 2.54, | 1.6, | 6.796, | 10.204, | 0 |
| 2.62, | 1.68, | 6.849, | 9.818, | 0 |

"END OF FILE"

modout

"Model Run For E:\models\Grange Hall Elementary.mod On 7/3/03 3:55:36 PM"

"Model is for SAPPONY CREEK."

"Model starts at the GRANGE HALL ELEMENTARY SCHOOL STP discharge."

"Background Data"

| "7Q10" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| 0, | 2, | 0, | 7.488, | 24.5 |

"Discharge/Tributary Input Data for Segment 1"

| "Flow" | "cBOD5" | "TKN" | "DO" | "Temp" |
|---------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .016, | 5, | 3, | .6, | 26 |

"Hydraulic Information for Segment 1"

| "Length" | "Width" | "Depth" | "Velocity" |
|----------|---------|---------|------------|
| "(mi)" | "(ft)" | "(ft)" | "(ft/sec)" |
| .94, | 1.329, | .058, | .32 |

"Initial Mix Values for Segment 1"

| "Flow" | "DO" | "cBOD" | "nBOD" | "DOSat" | "Temp" |
|---------|----------|----------|----------|----------|---------|
| "(mgd)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "(mg/l)" | "deg C" |
| .016, | 6, | 12.5, | 0, | 8.128, | 26 |

"Rate Constants for Segment 1. - (All units Per Day)"

| "k1" | "k1@T" | "k2" | "k2@T" | "kn" | "kn@T" | "BD" | "BD@T" |
|------|--------|------|---------|------|--------|------|--------|
| 1.2, | 1.581, | 20, | 23.058, | .35, | .555, | 0, | 0 |

"Output for Segment 1"

"Segment starts at GRANGE HALL ELEMENTARY SCHOOL STP"

"Total", "Segm."

| "Dist." | "Dist." | "DO" | "cBOD" | "nBOD" |
|---------|---------|----------|----------|----------|
| "(mi)" | "(mi)" | "(mg/l)" | "(mg/l)" | "(mg/l)" |

| | | | | |
|------|------|--------|---------|---|
| 0, | 0, | 6, | 12.5, | 0 |
| .1, | .1, | 6.458, | 12.128, | 0 |
| .2, | .2, | 6.762, | 11.767, | 0 |
| .3, | .3, | 6.966, | 11.417, | 0 |
| .4, | .4, | 7.106, | 11.077, | 0 |
| .5, | .5, | 7.204, | 10.748, | 0 |
| .6, | .6, | 7.275, | 10.428, | 0 |
| .7, | .7, | 7.316, | 10.118, | 0 |
| .8, | .8, | 7.316, | 9.817, | 0 |
| .9, | .9, | 7.316, | 9.525, | 0 |
| .94, | .94, | 7.316, | 9.411, | 0 |

*Seta primary
conditions for
calculation
if appropriate*

"Discharge/Tributary Input Data for Segment 2"

modout

| | | | | |
|----------|-----------|-----------|-----------|---------|
| "Flow", | "cBOD5", | "TKN", | "DO", | "Temp" |
| "(mgd)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "deg C" |
| 0, | 0, | 0, | 0, | 0 |

"Incremental Flow Input Data for Segment 2"

| | | | | |
|----------|-----------|-----------|-----------|---------|
| "Flow", | "cBOD5", | "TKN", | "DO", | "Temp" |
| "(mgd)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "deg C" |
| .005, | 2, | 0, | 7.369, | 24.5 |

"Hydraulic Information for Segment 2"

| | | | |
|-----------|----------|----------|------------|
| "Length", | "Width", | "Depth", | "Velocity" |
| "(mi)", | "(ft)", | "(ft)", | "(ft/sec)" |
| 1.68, | 1.33, | .076, | .23 |

"Initial Mix Values for Segment 2"

| | | | | | |
|----------|-----------|-----------|-----------|-----------|----------|
| "Flow", | "DO", | "cBOD", | "nBOD", | "DOSat", | "Temp" |
| "(mgd)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "(mg/l)", | "deg C" |
| .021, | 7.329, | 8.361, | 0, | 8.188, | 25.64286 |

"Rate Constants for Segment 2. - (All units Per Day)"

| | | | | | | | |
|-------|---------|---------|---------|-------|---------|-------|--------|
| "k1", | "k1@T", | "k2", | "k2@T", | "kn", | "kn@T", | "BD", | "BD@T" |
| 1, | 1.296, | 13.214, | 15.107, | .35, | .54, | 0, | 0 |

"Output for Segment 2"

"Segment starts at "

"Total", "Segm."

| | | | | |
|----------|----------|-----------|-----------|----------|
| "Dist.", | "Dist.", | "DO", | "cBOD", | "nBOD" |
| "(mi)", | "(mi)", | "(mg/l)", | "(mg/l)", | "(mg/l)" |
| .94, | 0, | 7.329, | 8.361, | 0 |
| 1.04, | .1, | 7.369, | 8.078, | 0 |
| 1.14, | .2, | 7.369, | 7.805, | 0 |
| 1.24, | .3, | 7.369, | 7.541, | 0 |
| 1.34, | .4, | 7.369, | 7.286, | 0 |
| 1.44, | .5, | 7.369, | 7.039, | 0 |
| 1.54, | .6, | 7.369, | 6.801, | 0 |
| 1.64, | .7, | 7.369, | 6.571, | 0 |
| 1.74, | .8, | 7.369, | 6.349, | 0 |
| 1.84, | .9, | 7.369, | 6.134, | 0 |
| 1.94, | 1, | 7.369, | 5.926, | 0 |
| 2.04, | 1.1, | 7.369, | 5.725, | 0 |
| 2.14, | 1.2, | 7.369, | 5.531, | 0 |
| 2.24, | 1.3, | 7.369, | 5.344, | 0 |
| 2.34, | 1.4, | 7.369, | 5.163, | 0 |
| 2.44, | 1.5, | 7.369, | 5, | 0 |
| 2.54, | 1.6, | 7.369, | 5, | 0 |
| 2.62, | 1.68, | 7.369, | 5, | 0 |

"END OF FILE"